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INTERNATIONAL CONTROL OF AVIATION IN TIME OF PEACE*

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Just two weeks ago today, the Dixie Clipper, one of the 72-passenger Boeing 314 flying boats, taxied out into Manhasset Bay, and took off for Marseilles, France, over the southern route via the Azores and Lisbon, with the first commercial load of passengers, express and mail to be transported by air across the Atlantic. Thus had aviation crossed the last of the seven seas, linking all of the important trade centers of the world with a network of commercial airlines. Two collateral developments have made possible the aeronautical conquest of this, the most lucrative of the great oceanic trade routes. First, the development of aircraft that could make the long over-ocean hop and safely overcome the severe weather conditions frequently encountered on the North Atlantic, and second, the cooperative activity of the governments concerned in working out international arrangements and specifying reasonable conditions under which the service might be operated.

The history of the technical development of aviation during the last twenty-five years is an Arabian Nights tale. From aircraft powered with small rotary engines, an instrument panel with a gas gauge, a tachometer, and an ignition switch, a framework of plywood covered with fabric and bound together with a network of struts and wires, capable of flying eighty miles an hour, we have advanced in twenty-five years to all-metal ships weighing 41½ tons, powered with four 1500 h.p. motors, manned by a crew of eleven, capable of transporting 72 passengers with all the comforts of an hotel, at a speed of 160 miles an hour. With this technical development have come all manner of legal problems—entry and clearance,

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customs, quarantine, immigration, public health, traffic rules and regulations—in fact, practically every legal problem known to the field of international transportation. But by reason of the physical characteristics of the aircraft and the medium through which it moves, these problems have not been answered by the application of well-defined legal precedent. International control of aviation might be answered in one phrase—it is done by governments. Necessarily, a discussion of governmental control involves a consideration of applicable treaties and conventions and their histories.

It is perhaps not generally realized that the concept of freedom of the seas and access to the ports of the world so fundamental to admiralty law has no counterpart in international aviation. Prior to the World War, a number of able legal scholars ardently advocated the "freedom of the air," and contended that above certain altitudes the airspace should be free to navigation of aircraft of all nations. Even at that time, the military and commercial potentialities of aviation had become apparent. But as a result of experiences with aircraft during the World War, it is perhaps fair to state that national expediency convinced statesmen and legal scholars alike that they could not accept the doctrine of freedom of the air and that complete and exclusive jurisdiction of the airspace over its territory was requisite in order not to impair a country's national sovereignty. This doctrine became the first and fundamental principle of the International Convention for the Regulation of Aerial Navigation signed at Paris on October 13, 1919, by representatives of twenty-six countries and it has been incorporated expressly or by implication in all subsequent multi-lateral or bi-lateral air navigation treaties. The United States has never ratified the Paris Convention of 1919 and although its legal scholars were among the last to desert the ranks of those who urged "freedom of the air," the refusal of other nations to adhere to this principle has compelled this nation to assert its exclusive national sovereignty over its airspace. In the original Air Commerce Act of 1926, and the amendment made thereto by the Civil Aeronautics Act of 1938, there is an assertion of this concept.

The universal acceptance of this doctrine of exclusive national sovereignty as applied to the airspace closed at once the opportunity for free development of commerce and private aviation, for no aircraft could fly over or land within the jurisdiction of a foreign country without first obtaining permission for the flight. This has resulted in a veritable network of international aviation treaties and agreements providing for innocent passage of private and commercial aircraft through the airspace of foreign countries. Most sched-

uled international air services, whether over land or between countries separated by the high seas, are based upon one or more aviation agreements. This country has ten air carriers engaged in international air transportation, and the inauguration of service by each air carrier has contributed to the body of public international aviation law.

Since the adoption of the Civil Aeronautics Act of 1938, this Government has favored, with few exceptions, a policy of having arrangements for any new international air service dealt with in agreements concluded between governments rather than between a private company and a foreign government. This is a departure, since under the Foreign Air Mail Act of 1928, air carriers engaged in air transportation were required to make their own arrangements for flying over and into the territory of foreign countries.

A discussion of the international control of aviation becomes more realistic when related to actual cases. In preparation for transatlantic service, Pan American Airways entered into a tripartite agreement with Imperial Airways and Aeropostale, a French company which had obtained an exclusive concession to use the Azores as an intermediate landing area in transatlantic service. When the French company was dissolved and lost the concession, Pan American Airways and Imperial Airways entered into contracts with the Portuguese Government which, in so far as American and British companies were concerned, gave them exclusive landing rights in the Azores and Portugal for use in the conduct of transatlantic air service. Beginning in 1935, and continuing for almost two years, negotiations were conducted between the Government of the United States and the Governments of the United Kingdom of Great Britain and Northern Ireland, the Dominion of Canada, and the Irish Free State, resulting in an agreement for a reciprocal transatlantic air service operating on a frequency of two round trips per week each, by an American company acceptable to this Government and a British company acceptable to the English Government. Thus, the United States had obtained for an American air carrier the right to land twice each week in British, Canadian, and Irish territory in the operation of a transatlantic service. In addition, early this year and pending the conclusion of a permanent air traffic agreement with France, this Government obtained temporarily four landing rights per week in French territory for use by American air carriers engaged in transatlantic service.

The naked right to land American registered aircraft in English or French territory does not satisfy all legal requirements for air transportation service. In addition to the requirements of do-

mestic law, providing for a certificate of public convenience and necessity, an air carrier operating certificate, certificated aircraft and certificated pilots, ground personnel and radio operators, the American company, in making a flight to London over the northern route, is subject to the provisions of the basic air navigation agreements between this Government and the Governments of Great Britain, Canada, and Ireland, effected by exchanges of notes between the respective Governments. Although such executive agreements are primarily applicable to the flight of private civilian aircraft, if regularly scheduled air transportation service is provided for in a collateral agreement, the terms of these general arrangements become binding upon the air transport enterprises. Once the American air carrier has been authorized to engage in international air transportation, and has been allocated by the Civil Aeronautics Authority the use of certain of the landing rights in the foreign country, then permission for the service is issued to the American air carrier by the foreign government.

A foreign air carrier seeking to fly into this country pursuant to the reciprocal arrangements between Governments, must obtain from the Civil Aeronautics Authority after application, notice and hearing, what is commonly known as a foreign air carrier permit. International aviation therefore is subject to more detailed international regulation than is any other means of transportation.

The pattern for most of the international arrangements for the control of aviation is to be found in the International Convention for the Regulation of Aerial Navigation, signed at Paris, October 13, 1919, and now in force in 32 countries, including most of the important commercial countries except the United States, Germany, Russia, and Brazil. Designed to permit the regulated development of international aviation, this was the first important multi-lateral agreement to recognize exclusive national sovereignty of airspace, and at the same time to recognize and control the "freedom of innocent passage" of aircraft of each of the contracting states above the territory of the other member states. No attempt is made to regulate the flight of aircraft in time of war. The control exercised by the Paris Convention over such innocent passage of aircraft may be divided into four headings: safety, military, commercial, and nationality.

The control of safety relates to the structural condition of aircraft, the equipment thereon, the competency of the flight personnel, and the circumstances under which flight may be conducted. The minimum standards prescribed by the Convention are applicable in all contracting states and are intended to assure safety of flight to

the occupants of the aircraft and protection to persons and property on the ground. Recognizing that the technical development of aircraft would require constant change in airworthiness requirements and in the regulations concerning the operation of aircraft, the Convention created a permanent commission, known as the International Commission for Air Navigation, commonly called by its French initials CINA, composed of representatives of all the member nations. The CINA is given broad legislative power to promulgate, revise and amend uniform technical regulations published in "annexes" to the organic agreement by which CINA was created and corresponding to the Civil Air Regulations promulgated by the Civil Aeronautics Authority. This delegation of regulatory power to an international commission has caused some legal scholars to question whether the United States can constitutionally ratify the Paris Convention, claiming that it is an invalid delegation of legislative power.

The Convention reserves to each contracting state, in the interests of public safety or for military reasons, the right to establish prohibited areas and to prescribe the routes which may be utilized by foreign aircraft in flight over its territory. This plenary power which may be exercised without limit, except that there shall be no discrimination, seems in some instances to have seriously handicapped flight over certain countries for in some instances the air routes prescribed have no reasonable relationship to the commercial convenience of foreign aircraft. The transportation by air of explosives, arms, and munitions of war over the territory of another state is prohibited and each state is free to regulate or prohibit the carriage of photographic apparatus and under certain circumstances the carriage of other articles.

The Paris Convention does not of itself accord the right to conduct scheduled international air transportation, but by specific language provides that the operation of such service into and over the territory of each contracting state shall be conditioned upon specific authorization normally covered by supplemental agreements. In other words, the Convention establishes only the general conditions of flight of commercial aircraft, and does not purport to be an air traffic agreement permitting the aircraft of one contracting state to engage in scheduled operations into or over the other member states, even to the extent of a non-stop service. Cabotage, or intra-country air transportation, may be reserved by a country to aircraft of its own registry.

Since the Convention seeks to regulate the conditions of international flight and to prevent discrimination between aircraft registered in the various contracting states, the provisions relative to

nationality are extremely important. The aircraft may be registered in only one state, taking the nationality of that state. On international flight it must carry an extended list of documents issued by the country of registry, thereby advising the other contracting states over which the flight is made that the aircraft is airworthy and the pilots competent.

A second Convention, and one which has more importance in so far as this country is concerned, is the Convention on Commercial Aviation adopted at Habana, Cuba, February 20, 1928, by the United States and other American Republics. The Habana Convention has been ratified by the United States, Mexico, and ten of the Central and South American countries. Like the Paris Convention, the Habana Convention recognizes exclusive national sovereignty of airspace, and upon this premise prescribes the conditions for freedom of innocent passage of aircraft of one state through the airspace of other member states. At the same time, it is made quite clear that foreign aircraft shall at all times be subject to the laws and regulations of the country over which the aircraft is being navigated.

The political philosophy behind the Habana Convention differs materially from that of the Paris Convention. The Paris Convention seeks to prescribe uniform minimum standards which must be accepted by all of the contracting states, leaving them free to impose higher standards for their own aircraft and flight personnel. On the other hand, the Habana Convention does not establish even basic minimum standards but leaves that to the member states and provides for acceptance by the other parties to the Convention of certificates of airworthiness and of airman competency issued by any contracting state. Furthermore, since the Habana Convention does not contain a uniform set of technical regulations, there was no occasion at the time of its adoption for a representative organization such as CINA empowered to promulgate such regulations. Upon each of the contracting states is imposed the duty of exchanging technical data and other information necessary to make the Convention operative, making use wherever possible of the available facilities of the Pan American Union.

Since no uniform standards relative to safety are imposed by the Convention, it is provided that an aircraft engaged in international flight must comply with the airworthiness requirements of each of the contracting states over which it is to fly and the state registering the aircraft is required to issue a certificate of airworthiness stating that in the opinion of the issuing authorities the aircraft complies with the airworthiness requirements in each of the contracting states in which it is to be operated. The state over which

the aircraft is to be navigated is given the right to refuse to recognize as valid a certificate of airworthiness of a foreign aircraft if inspection reveals that the aircraft is not in fact reasonably airworthy under the requirements of the inspecting state. Although creating certain administrative difficulties, in this way a state can protect itself against the flight of aircraft which are not believed to be airworthy. In much the same fashion, the pilot's certificate of competency is required to contain a provision that the pilot has "passed a satisfactory examination with regard to the traffic rules existing in the other contracting states over which he desires to fly."

Each state in the protection of its domestic commerce is authorized by the Convention to reserve in favor of its own national aircraft the commercial transportation of passengers and goods between two or more points in its territory, but it expressly provides that aircraft engaged in international air transportation shall be permitted to embark and disembark passengers and cargo at one or more airports provided that all of such traffic originates at or is destined for some point in a foreign country.

The control of the transportation of munitions of war, flight over prohibited zones or restricted areas, the establishment of customs airports, the designation of civil airways, and the requirement of equality of treatment of the aircraft and crew of all contracting states exercised by the Habana Convention is comparable to that found in the Paris Convention.

It has been urged by some authorities that the main purpose in adopting the Habana Convention was to facilitate the establishment of international commercial air transportation whereas the Paris Convention merely prescribes general rules of flight for foreign aircraft. Some force is lent to this argument by the fact that unlike the Paris Convention there is no provision in the Habana Convention requiring the conclusion of special air traffic arrangements before an international airline may be established. However, the Habana Convention does not prevent the states from entering into special air traffic agreements with one another so long as such agreements do not impair the rights of other contracting states accorded under the Convention. Suffice it to say that although the United States has been a party to the Convention for eight years, every American air carrier operating in Central or South America has been required to obtain specific authorization for the conduct of such service, as has a Mexican company for operations into the United States.

As heretofore indicated, the Paris Convention was not ratified by all countries nor was the Habana Convention accepted by all the

American Republics. It was quite natural therefore that a series of bi-lateral agreements for the control of international air navigation should be entered into between states not parties to these Conventions, or between parties and non-parties. Fortunately, the confusion which reasonably might be expected from such a multiplicity of texts has been avoided by the fact that these arrangements have been modeled after the Paris Convention. Approximately fifty of such general air navigation arrangements have been consummated throughout the world. By these agreements, one contracting state grants to the aircraft of the other contracting state freedom of innocent passage in time of peace. Many of them specify the corridors of entry, and all of them reserve to the member states the right to prohibit flight over restricted areas. They likewise provide that in foreign flight the aircraft and crew must be possessed of all certificates and licenses required in the country of registration, and contain a provision that the other contracting state will accept such certificates and licenses as valid. The aircraft crew and passengers are required to abide by the applicable laws, rules and regulations of the country over which the flight is made, and the foreign aircraft, in general, are accorded equality of treatment. Usually the agreements reserve cabotage rights to aircraft of the particular state, and specifically provide that regularly scheduled commercial services into the territory of the other contracting state can be inaugurated only after the granting of special permission by such latter state. The United States is a party to twelve of such general air navigation arrangements and has four other such arrangements in the process of negotiation.

It is customary to permit the flight of a foreign aircraft in a given country only if it is operated by a pilot certificated as competent to navigate the particular aircraft by the same foreign country. However, occasions arise where a foreign pilot desires to navigate an aircraft registered in another country. For example, a British certificated pilot desires to fly an American aircraft. To meet this situation a second type of bi-lateral arrangement has been utilized providing for the issuance by each country of airman competency certificates to nationals of the other country. Such agreements make it possible for this Government to issue a certificate of competency to the British pilot thereby enabling him to fly an American aircraft. The United States has entered into eight of such arrangements and there are several others pending.

To expedite the exportation of aircraft a third category of bi-lateral arrangements providing for the mutual acceptance of certificates of airworthiness for export has been negotiated. Such

agreements are particularly important to the manufacturers for by their terms they provide that aircraft of United States manufacture for sale abroad, if certificated as airworthy for export, will be accepted as airworthy by the aeronautical authorities of the country to which they are delivered without further inspection. In some cases the exporting country must certify that the aircraft meets special requirements of the importing country. This Government has negotiated nine of such arrangements and has a number of others pending.

At the outset, I mentioned the air traffic arrangement which had been concluded between the Governments of the United States and of Great Britain, Canada, and Ireland for transatlantic air service which might be said to fall within a fourth category. That agreement represents those entered into between Governments. In addition there are special arrangements between a Government and a foreign air transport company, or between the competent aeronautical authorities of the contracting states, or finally, those arrangements, sometimes called "pools," between two or more national air transport companies. It is impossible to state accurately how many of such arrangements actually are in existence, but the most recent information available would indicate that there are in excess of sixty such arrangements. All such traffic agreements either specify the route to be operated by the air carrier nominated by the other party to the agreement or contain provisions for the specification of such route by the competent authorities. In some of the arrangements the route specified is between a terminal in each contracting state, and is operated by the respective national companies on a strictly reciprocal basis. Such an agreement is that providing for the transatlantic service. Another group of arrangements permit each national company to operate over and beyond the territory of the respective contracting states. A third type is that where one company operates a service over and beyond the other state, while the other operates only between terminals in the two states. An example is found in the Convention between Great Britain and Greece wherein the British company flies through Grecian territory to Asia and Africa, while the Greek company terminates its service in English territory.

All of the air traffic agreements provide for the acceptance of the airworthiness and airman competency certificates issued by the other state. Some of them specify in detail such matters as frequency of service, route to be followed, airports to be utilized, radio and meteorological service to be made available, etc. Others are brief and general, leaving the details to the competent aeronautical

authorities of the respective countries, and in some instances, leave such arrangements to the operating carriers. Several of such agreements require that the flight personnel shall be nationals of the country of registration of the aircraft, while others require that the ground organization of the air carrier stationed in the other contracting state shall be nationals of such latter state. The agreement between Italy and Greece contains an interesting provision relative to the nationality of the respective air carriers engaged in such international service, and gives to each of the contracting states the right to check the nationality of the company registered in the other country.

Practically all of these air traffic agreements prohibit cabotage and exempt from customs duties the aircraft and equipment and fuel supplies used in the international service. Some of them contain provision for exemption from income and other corporate taxes. All of them require the air carriers to observe the air traffic rules, laws, and regulations in force in the other state and provide that the carriage of mail shall be subject to agreement between the postal administrations.

The sanitary and public health precautions that an aircraft employed in foreign air transportation must comply with is a field of international control that has not been dealt with directly by the conventions and bi-lateral agreements I have discussed. In linking distant ports of the world by swift transportation, aviation, without proper safeguards, could become a spreader of contagious and infectious diseases. It is well known that carriers of tropical fevers generally die during an extended voyage of an ocean-going steamer and that during such a voyage the period of incubation for most diseases passes. This is not equally true of the flight of the swift air transport. To prevent the carriage of disease by aircraft the United States Public Health Service and the companies engaged in international air transportation fumigate and employ other scientific methods to minimize the danger. No uniformity of procedure existed for each country applied its own national regulations. With a view to the codification of the procedures to be followed, the International Sanitary Convention for Air Navigation was signed at The Hague, April 12, 1933, establishing uniform sanitary procedures to permit the entry of aircraft from one country into another without unnecessary delay or hazard when the aircraft comes from an infected district. It also provides for the establishment of sanitary airdromes and the medical services and facilities to be maintained at such airdromes as well as for the measures to be applied when infectious diseases are found to exist. The Convention was ratified

by the United States in 1935 and is now in effect in 24 other countries, including Bolivia, Brazil, and Chile in the Western Hemisphere.

While the speed of aircraft offers a new means of transmitting disease, it likewise offers facilities for the prevention of the spread of such disease in the event of epidemics or catastrophes. In February of this year, a Sanitary Aviation Conference at Montevideo considered the organization in Pan American countries of air services for the purpose of rendering medical assistance to, and the transportation by aircraft of, the sick and wounded.

No discussion of the international control of aviation is complete without consideration of the International Conferences on Private Air Law, which have dealt with the legal relationship of the air carrier as an individual to other air carriers, to passengers, to shippers, and to third persons and property on the ground. As private and commercial flying became more important, so also did the question of the liability of the carrier. This question did not logically come within the scope of the Paris Convention of 1919. Furthermore, by 1924 only seventeen states had ratified the Convention. In order that all countries might participate in the codification of private international air law, the French Government called an international conference which met in October, 1925, to consider the codification of private air law. The most important accomplishment of the conference was a recommendation for the creation of a permanent international committee of aerial legal experts to study and make recommendations for the codification of private air law. The committee was created the next year, and is popularly known as CITEJA, the initials of its French name. Since its organization it has met semi-annually to draft proposed conventions on private air law which from time to time are submitted to diplomatic conferences for final adoption and signature. The outstanding achievement of CITEJA was the drafting of what is commonly called the Warsaw Convention, adopted in 1929 and ratified by 29 countries including the United States, on October 29, 1934. This Convention attempts to unify rules concerning liability of international air carriers to persons and property on board the aircraft. It applies to all international transportation of persons, baggage and goods performed by aircraft for hire. Fault is the basis of the air carrier's liability, but elaborate provision is made for the exoneration of the carrier and its agents from liability. Contributory negligence of an injured party may wholly or partially excuse the air carrier depending upon the *lex fori*. Liability of the carrier is limited to 125,000 French francs or about $8,300 per passenger, and the Convention specifies limits for damage to baggage or goods. None of the limi-

tations on liability is applicable in case of willful misconduct of the carrier.

Under the Warsaw Convention, some very intriguing problems of law are certain to arise. Suppose a person in Berlin buys a through ticket to San Francisco and proceeds over a European, a transatlantic and a domestic airline, taking advantage of stop-over privileges en route; is the trip between Chicago and San Francisco of such character as to be considered international air transportation and thus within the purview of the Warsaw Convention?

The second phase of the air carrier's liability is that *vis-a-vis* third persons and property on the ground. This is one of the most important and at the same time, most controversial subjects of private air law. The Rome Convention, signed in 1933, attempted to solve this problem, but it has never been ratified by a sufficient number of states to become effective. The Convention is applicable only to cases of ground damage in one contracting state caused by aircraft registered in another contracting state. Liability arises upon a showing of damage caused by the aircraft but is limited in amount and the recovery is guaranteed by compelling the carrier to carry insurance or to maintain a cash deposit sufficient to satisfy the payment of all claims. Contributory negligence is a defense available to the air carrier.

A complicated formula based upon 250 French francs per kilogram times the gross weight of the aircraft with a minimum limit of 600,000 francs and a maximum limit of 2,000,000 francs or about $132,000 per accident establishes the limitation upon liability. Of the total amount for which the operator may be liable, one-third is appropriated to damage to property and the remaining two-thirds to damage to persons but the recovery of any one individual is limited to 200,000 francs or about $13,200. In case of gross negligence, willful misconduct, or failure to insure, the liability of the operator is unlimited.

By way of contrast it may be noted that the Habana Convention, to which the United States is a party, provides that "reparations for damages caused to persons or property located in the subjacent territory shall be governed by the laws of each state." This is a frank recognition of the difficulty or impossibility of obtaining uniformity in this field of private air law.

The Rome Convention failed to prescribe the precise terms of and the exemptions which might be contained in the required insurance contracts, and until the defenses available to the insurance companies were determined, the insurance carriers were opposed to the ratification of the convention. As a result, the Fourth Inter-

national Conference on Private Air Law, held at Brussels in September of last year, adopted a protocol providing that the insurer might interpose certain defenses in addition to those available to the operator. Since this protocol has not been ratified by any of the signatory states, no discussion of these defenses appears necessary, except to point out that there is some doubt as to whether the insurance protocol as signed at Brussels is satisfactory to the insurance carriers.

A second accomplishment of the Brussels Conference was the adoption of a "Convention for the Uniformity of Certain Rules Relating to Assistance and Salvage of Aircraft or by Aircraft at Sea." This Convention offers a uniform set of rules specifying the assistance an aircraft must give to other aircraft and vessels in distress at sea, and the assistance a vessel must render to aircraft in distress. The commanding officer of an aircraft is obligated to render assistance to any person who is at sea in danger of being lost, but the obligation exists only in so far as he "may do so without serious danger to the aircraft, her crew, her passengers, or other persons." A similar duty is imposed upon the captains of surface vessels. Assistance means any help which may be given to a person in distress and may consist of "merely giving information, consideration being given to the different conditions under which maritime navigation and air navigation operate."

The Convention recognizes the type of assistance that can be rendered in an aircraft disaster at sea, and rewards the saving of human life by providing that one who saves human life at sea may be indemnified for all expenses incurred in such service, but a volunteer is not entitled to indemnity, unless he has obtained a useful result. Liability of the aircraft operator for the expenses so incurred is limited to 50,000 francs per person saved with a maximum limit of 500,000 francs or approximately $33,000. This indemnity for life salvage under the Brussels 1938 Convention is unique, having no precise counterpart in the Brussels 1910 Maritime Salvage Convention. Even though the salvage operation is unsuccessful the one rendering assistance may secure an indemnity for the expenses incurred not exceeding the maximum indemnity provided for saving one life.

The Convention follows the maritime practice in establishing the rights and obligations concerning the salvage at sea of the aircraft and its cargo. In addition to the indemnity for saving life, if a useful result is accomplished the salvor is entitled to remuneration which is determined by the value of the property salvaged and other specified considerations, with a maximum limit of the value of the

property salvaged at the conclusion of the operations of assistance or salvage. So far as is known, this Convention has not yet been ratified by any country.

Before closing, I wish to direct your attention to an organization now being established in the Western Hemisphere—the Permanent American Aeronautics Commission, commonly referred to as CAPA. Since 1916, the American Republics have been interested in the preparation of a uniform code of international air law. Only Argentina, Uruguay and Peru are members of the Paris Convention with its CINA which has developed under European influence. The Habana Convention is in effect in only 12 countries. Bi-lateral agreements are in effect between the United States and Canada, and between Argentina and Uruguay, and there is a bi-lateral commercial aviation agreement between this Government and Colombia.

The vast network of commercial aviation now connecting the Americas has been made possible by agreements reached between the governments of the states flown over and the operating companies. All flying between countries of the Western Hemisphere not parties to international agreements or flight not within the terms of such agreements depend upon special permissions being granted for the particular flight. The delays incident to obtaining such permissions through diplomatic channels constitute a serious impediment to the growth of international aviation in this hemisphere. In the field of private air law the only active organization is CITE JA, with which in this hemisphere only the United States, Argentina, Brazil, Dominican Republic, Guatemala, Mexico, and Peru are associated. In this hemisphere the Warsaw Convention has been ratified only by the United States, Brazil, and Mexico.

Eventually, at the Buenos Aires Commercial Conference held in 1935, it was decided, among other things, to hold a technical aviation conference. This conference, known as "The Inter-American Technical Aviation Conference" met at Lima, Peru, in September, 1937. Outstanding among many important resolutions adopted is the one providing for the creation of the CAPA, a permanent aeronautical organization to perform in this hemisphere certain of the functions now performed by CINA and by CITEJA. The mission of CAPA is to bring about (1) the gradual and progressive unification and codification of international public and private air law; (2) the coordination and development of mutual interest in technical subjects related to aircraft, pilots, airways, and facilities for air navigation, including airports and operating practice and procedure; and (3) the organization and marking of inter-American air routes and the possible coordination of local air serv-

ices as between themselves and in relation to the services of international air lines.

The resolution of the Lima Conference providing for the creation of CAPA recognizes that the American Republics are confronted with peculiar and difficult legal and technical problems, and emphasizes the need of uniformity of public and private international air law throughout the Americas. Although much can be gained from a study of the Paris Convention and the conventions either now completed or in preparation by CITEJA, they may not be suitable in their entirety in all Pan American countries. The charging of the same organization with the mission of coordinating and developing mutual interest in technical subjects and in developing inter-American air routes and services reveals that the framers of this resolution recognized that legal codes cannot be prepared without considering the present status of the development of aviation and the peculiar problems of flying in the Americas.

CAPA will not come into being until national commissions, composed of jurists, professors and aviation experts have been organized in seven countries, and within twelve months thereafter the first session is to be held at Bogota, Colombia. One of the chief functions of the national commission is the maintaining of close contact with other national commissions, exchanging proposals and making recommendations for the uniform treatment of the juridical and technical problems of international aviation for consideration by CAPA.

The United States is presently engaged in the organization of its national commission, and it is hoped that the other American Republics will do likewise in order that CAPA may soon commence its functions. A provision in the resolution contemplates that conventions prepared by CAPA and adopted by member countries shall be open to adherence by non-member countries. In this organization there is an opportunity for the American Republics to study and codify the legal and technical problems of international aviation, bringing about in a practical manner uniformity and the orderly development of international aviation which should serve further to promote friendly intercourse between the countries of the Americas.

The international influence of aviation, molding the conduct of nations and dictating their policies, was not apparent until Munich. We may reasonably expect that with the extension of airlines and routes to all points of the compass, linking together the continents and bringing together the remote corners of the earth, international problems will multiply. These circumstances will compel the simplification and codification of the rules controlling international aviation.

AIR FREIGHT FOR THE UNITED STATES

By William M. Sheehan*

Introduction

Air transportation in the United States has expanded at an extraordinary rate, without any service having been provided for handling heavy, bulky goods cheaply. The fact that the shipment of goods, large or small, has contributed least to the growth of airline operations[1] suggests that this subject is not receiving all the attention it merits. It may be asked, therefore, whether the development of a profitable, unsubsidized air freight service at the present time is feasible.

The type of goods specified as "air freight" herein may be distinguished in general from air express shipments by their greater weight and size and lesser intrinsic value. An air freight service would, in fact, supplement rather than compete with the present air express service. Although reference will be made primarily to the possibility of freight service along the present air mail route between New York and San Francisco, the scope of this investigation includes any two remote points in the United States connected by a government maintained airway, the termini and intermediate stations of which are sufficiently important to justify such a service.

There has been much discussion of late about the importance of aviation to the national welfare. It is generally agreed that "hardly another civil activity of our people bears such a direct and intimate relation to the national security as does civil aviation."[2] Yet the question of whether or not our air transport industry can be expanded on a sound basis to facilitate shipments of heavy, bulky commodities is almost entirely neglected. Involvement in a major war would make it necessary for the United States to increase suddenly much of its industrial activity. In such a case, the need of a well-functioning air freight system might be shockingly apparent. Quick and efficient movement of tools and supplies from one industrial center to another is just as imperative as the defence of our shores by battleships or the access to raw materials

* The author wishes to express appreciation to Dr. Wayne L. McMillen of American Airlines, Inc., Chicago, for his helpful comments and suggestions.

1. Express pound-mileage flown in 1938 was approximately one-third that of mail and one twenty-fourth that of passenger traffic (allowing 200 pounds for each passenger and baggage). Civil Aeronautics Authority.

2. President Roosevelt, address to National Aviation Forum, January, 1939.

by a strong merchant marine. Especially in the production of aircraft, necessitating the assembly of engines, propellers and accessories from every corner of this vast country, would this need be urgent. During World War I a 600 per cent annual loss of first line airplanes was suffered on each side. In World War II the rate of loss may be even greater. With the present unsettled state of world affairs it can hardly be judged too soon for the United States to build up a dependable commercial air freight service.

Even without the consideration of war an efficient and profitable air freight system would be a most important contribution to the national welfare. Many economists assert that the United States sadly needs important new industries and that her prime problems of unemployment and lagging trade would be largely solved by expanding her frontiers in some new direction.[3] By developing the one untried branch of airline enterprise whose quickening influence would most readily be felt throughout industry and trade, a step toward the solution of these economic problems could indeed be made.

Yet, persuasive as such considerations of national welfare may be, the question remains, is the development of an air freight service on a profitable, unsubsidized basis at the present time feasible? The subject will be considered in four parts: first, the demand for an air freight service; second, the cost thereof; third, a suitable rate structure and the resulting profits; and fourth, routes and schedules.

I. Demand

The enormous quantities of goods that move in the United States every day by trains, trucks and boats indicate that a large latent demand exists for any rapid, moderately-priced freight service. Speed perhaps more than any other attribute characterizes our times, and the quickest kind of transportation ordinarily commands an advantage. The need for an air freight service will be considered both quantitatively and qualitatively, that is, with reference to the amount of traffic which may be expected and to the nature of that traffic.

Amount of Traffic

Only recently have goods begun to move by air. In this country practically all such traffic goes as express on the regular passenger and mail schedules of the airlines. The following table shows that the increase of air express traffic during the past ten years has been

3. Alvin H. Hansen, in a paper entitled "A Rational Program for Economic Recovery" presented at the first session of the Economic Advisory Council of the National Industrial Conference Board, February 23, 1939.

extremely rapid and augurs well for the development of a similar air freight service.

TABLE 1

DOMESTIC AIR EXPRESS TRAFFIC[4]

Year	*Volume*
1929	249,634 lbs.
1930	359,523 lbs.
1931	788,059 lbs.
1932	1,033,970 lbs.
1933	1,510,215 lbs.
1934	2,133,191 lbs.
1935	3,822,397 lbs.
1936	6,958,777 lbs.
1937	7,127,369 lbs.
1938	7,335,967 lbs.

In an exhaustive study[5] of the nature of air express operations in 1934, it was shown that traffic was confined almost entirely to shipments of small size and high value and to objects required in emergencies. It was further shown that three quarters of all shipments weighed five pounds or less, while the average weight of shipment was six and a half pounds. The most recent statistics indicate that these characteristics have altered very little. With a tariff of nearly one dollar a pound for distances greater than 2,349 miles, where the lowest pound-mile rates are offered,[6] only commodities urgently needed, of insignificant weight or of great value will continue to be attracted to Air Express. Perhaps the most remarkable feature about the growth of air express traffic is that it has been achieved in the face of high rates. If six or seven million pounds of light, high-value goods move each year under present rates of Air Express, one may expect many more pounds of heavier, less valuable goods to be attracted with an appreciably lower air freight tariff.

From time to time studies have been made of the increase in shipments of goods by air to be expected with given reductions of rates. One of the most reliable of these[7] concludes that a large increase in traffic may be expected with, and only with, a substantial decrease in rates. With respect to this study, an authoritative comment follows:

"The present transcontinental air express rate is about eight times the rail express rate. It has been estimated that a decrease in this rate to about

4. Civil Aeronautics Authority statistics.
5. W. L. McMillen, "Air Express in the United States," *Journal of Land and Public Utility Economics.* August-November, 1935 and February, 1936.
6. *Cf.* Appendix II.
7. Unpublished paper of J. F. Scheetz, "Investigation of Air Express Possibilities," quoted in McMillen, *op. cit.*

four times the rail rate would increase the volume about one hundred per cent, while a decrease to three times the rail rate would increase the volume five hundred per cent. It has also been estimated that at an average rate of 30 cents per ton-mile the volume of air express would be nearly 9,000,000 ton-miles annually or nearly 20 times the present volume. These estimates seem to be conservative."[8]

Another estimate, made in 1932, indicates that with lower rates, air carriers might get a large amount of commodity transportation business from trains and trucks. This opinion states:

"Very roughly, the present express business done in the United States on railroads and highway vehicles totals about 800,000,000 ton-miles. I believe that, at rates which should be attainable within the next six or eight years, about 3 per cent of it can be swung over into the air, or a total of about 25,000,000 ton-miles. It ought to be possible to attract an equal amount of traffic from the fast freight services which many railroads are now running between important centers."[9]

This would amount to a twenty-five fold increase in the 2,000,000 ton-miles of commodity business flown at present.

These figures, incidentally, demonstrate that great as the expansion of air freight traffic may be, the loss thereof to trucks and trains would prove relatively insignificant. Nor need one fear appreciable loss of express traffic by the existing airlines. As will be shown subsequently, slower schedules and rates partial to long and heavy hauls will not only create new business for air freight, but will tend to prevent loss of present express business to the airlines. In fact, the existing companies may have all they can do to accommodate their faster moving and rapidly expanding passenger, mail and express traffic. It is possible that in the near future all first class United States mail will be forwarded on regular air mail schedules, as is now being done in many European countries, including Great Britain.

In view of the foregoing estimates it is reasonable to believe that a great quantity of air freight business is awaiting development, provided a way can be found to offer rates appreciably lower than those now in effect for air express. Subsequently the practicability of an average rate of 30 cents a ton-mile, mentioned above as prerequisite to such development, will be examined.

Nature of Traffic

Not only the amount but also the nature of traffic to be expected with air freight should be considered. Reference has already

8. Editorial by F. D. Fagg, Jr., 6 JOURNAL OF AIR LAW 424, July, 1935.
9. E. P. Warner, *Aviation*, August, 1932, p. 343.

been made to one aspect of this subject, viz., that air freight shipments should not be expected to include small, light packages of high value. These could continue to stand the higher cost of express service, and should be encouraged to do so by a tariff more favorable to heavy and bulky shipments.[10] Individual air freight shipments may be expected to weigh from about ten pounds to the limit of the aircraft's capacity, which would be in the thousands of pounds,[11] with the average weight fairly close to the former figure.

Another and more difficult aspect of the nature of traffic is the kind of goods likely to constitute air freight shipments. The service to be offered by air freight, from the point of view of both speed and rates, would be intermediate in character to the present services of rail and air express. Consequently, a freight airline may be expected to carry the same general types of goods now handled by one or both of these services. In the following paragraphs analyses of rail express and air express traffic will be shown, after which an attempt will be made to determine upon which of the specified classes of goods air freight would be most likely to draw for its traffic.

The following table lists the main classes of goods moved by rail express:

TABLE 2

GOODS MOVED BY RAIL EXPRESS[12]

Newspapers, Printing and Advertising Materials
Machines, Parts and Supplies
Valuables
Photographic Material
Dry Goods (half the volume)
Cut Flowers
Perishable Foods
Laundry
Livestock
Miscellaneous Items

An analysis of goods moved by air express is, perhaps, an even better indicator of the kinds of commodities likely to constitute air freight traffic. This appears below in Table 3, which adheres to the same classifications as Table 2. It is based upon a nation-wide survey of the air express business in April, 1937, and shows what percentage of the total number of shipments each of the above classifications represents.

10. *Cf.* Rates, p. 483.
11. Shipments of machine parts weighing 500 or 600 lbs. are already made occasionally by Air Express.
12. F. Quindry, 4 JOURNAL OF AIR LAW 145, April, 1933.

TABLE 3

GOODS MOVED BY AIR EXPRESS[13]

(In percentage of total volume)

1.	*Newspapers, Printing and Advertising Materials*..... Newspapers and Racing Forms (7.96%); Electros, Matrices, Printers' Materials (11.22%); Advertising Matter (4.00%); Transcription Records and Radio Material (2.74%).	25.92%
2.	*Machines, Parts and Supplies*..... Steel Products (5.17%); Auto and Rubber Accessories (5.05%); Aviation Supplies (.96%); Oil Company Supplies (.70%); Electrical Products, Telephone and Refrigerator Parts (2.56%); Optical and Camera Supplies (1.80%); Medical Supplies (1.71%).	17.95%
3.	*Valuables* ..... Valuable Bank Papers (5.45%); Ship Clearance Papers (3.40%); Investment Bankers' Prospectuses (1.42%); Jewelry (2.14%); Gold (.08%); Currency (.03%); Personal Shipments (5.25%).	17.77%
4.	*Photographic Material* ..... Motion Picture Films (5.21%); News Photos (9.21%).	14.42%
5.	*Dry Goods* ..... Clothing (8.25%); Millinery, Shoes and Fine Fabrics (5.22%).	13.47%
6.	*Cut Flowers*	1.84%
7.	*Perishable Foods*	1.34%
8.	*Laundry*	Negligible
9.	*Livestock*	Negligible
10.	*Miscellaneous Items* ..... Products of Local Industries (2.36%); Liquor (.52%); All Other Items (4.41%).	7.29%
	Total	100.00%

Most of the classes of shipments represented in the above two tables may be expected to move regularly by air freight in substantial volume. But goods that are extremely heavy, bulky or of very low value per unit weight are not likely to be attracted away from the rails. And small items of great value or that are urgently needed should continue to go by fast air express. Applying these general principles to the various classes of Tables 2 and 3 suggests the following comments:

1. *Newspapers, Printing and Advertising Materials.* These articles are especially suitable for air transportation because they provide a large and fairly regular demand. Yet the preponderance

13. Information supplied by the Air Express Division of the Railway Express Agency in letter of January 17, 1939. Weight and revenue statistics not available.

of these shipments in present air express traffic, as shown in Table 3, does not necessarily indicate that this class of commodity will predominate in an air freight business. The large individual newspaper shipments now carried by air express are most practical on comparatively short hauls, and there slow flying air freight could not offer an appreciable time advantage over surface transportation. Radio, telegraph and teletype services make it increasingly unlikely that, even with lower air freight rates, many news publications would be transported regularly on long hauls. The Pacific Coast Edition of *The Wall Street Journal,* for instance, is printed separately from the New York edition, in the far West. *Time,* Inc., which at present prints its weekly news magazine in Chicago and distributes from there, would rather set up printing equipment in California and make western distribution than pay as little as 30 cents a ton-mile to achieve earlier delivery by air freight.[14]

2. *Machines, Parts and Supplies.* Shipments of this character are often needed in a hurry and in this respect they are well suited to air transportation. Since they are usually heavy, the cost of sending them by air at present is considerable. Nevertheless they constitute, as shown in Table 3, one of the major air express classifications. It would seem entirely likely that a long-distance freight airline which connects a number of large industrial communities would find this one of its most important types of shipment. An air freight line could build up its activity in this category by enabling all sorts of businesses to operate with reduced inventory and hence reduced overhead. In recent times, many enterprises, especially chain store companies, have found it advantageous to operate with greater turnover in order to keep down inventory taxes and increase return on invested capital. Rapid turnover also effects closer attention to customer wants and reduces style losses. The great number of business enterprises which now use rail express for the above purposes might find the use of air freight a further step in the direction of economies. Indicative of the promising and profitable nature of this particular sort of traffic is the fact that private airplane operators have already begun to carry supplies for various industrial concerns between specified points. It would hardly seem likely that such operators could with sound operating practices compete successfully against a common carrier freight airline. Yet if they are allowed to develop unchecked by regular airline competition, they may some day constitute the same sort

14. Letter from N. L. Wallace, Production Manager of *Time,* Inc., who points out that more than half of *Time's* circulation must go through the U. S. Post Office for delivery anyway.

of threat to air freight common carriers as the contract carrier trucks have been to the railroads of the country.

3. *Valuables.* These shipments are almost invariably of light weight, small size and great value either intrinsically or to the shipper. Cost of transportation is not of primary importance when articles of great value must be shipped in a hurry. They are much better suited to air express than to air freight.

4. *Photographic Material.* Because of small weight and the need of rapid shipment, these articles may be expected to move by air express rather than by air freight.

5. *Dry Goods.* This class of commodity constitutes, as indicated by Tables 2 and 3, approximately one-half of rail express and one-eighth of air express traffic today. With rates closer to those of rail express, a much larger proportion of these articles would be attracted to air freight than has been moved by air express. Merchants desire speedy air shipment of various expensive styled goods, such as millinery, furs, dresses, gowns and shoes, because: 1) last minute re-ordering during special sales and holiday seasons is made possible; 2) displays can be made simultaneously with those in New York; and 3) goods received overnight have enhanced sales appeal.[15] Considering the frequent changes in feminine styles, the sudden sallies on dealers' stocks and the desirability of low inventories, a low-cost air freight service should carry a very appreciable amount of dry goods.

6. *Cut Flowers.* The shipment of cut flowers from west to east and from south to north offers inviting possibilities. California orchids and gardenias are shipped by rail to New York regularly, where they bring much higher prices because they are hardier and larger than the eastern hot-house variety. The San Francisco region alone shipped east more than 1,500 carloads of roses, orchids, carnations, gardenias, camellias, chrysanthemums and lilies, worth $3,000,000, in 1937.[16] Shipments of orchids and gardenias by air express from the same region frequently average 1,500 pounds a week, with well over a ton before Easter, Mothers' Day and other special times.[17] Much of this highly perishable traffic which now crosses the country by rail in four or five days could be attracted to a faster and but moderately more expensive air freight service.

7. *Perishable Foods.* Air express has been able to gain only a small amount of this traffic from rail express. With lower rates

15. Sampling survey, reported in *Express Messenger*, April, 1938. Pictures in *Life*, August 9, 1937, illustrate the third point, showing dress costing $25-$29 originally, but, after three weeks, $8.90.
16. *Express Messenger*, April, 1938.
17. *Ibid.*, April and June, 1938.

air freight should be able to win more of it, especially of the shipment of foods having high value per unit weight, e.g., tropical fruits, tree-ripened figs, strawberries, asparagus and artichokes. Ripe-picked fruits and vegetables usually have better flavor than produce picked green so that it may ship well, and accordingly command better prices. Shipments of seasonal fruits and vegetables during times of crop shortage, as well as the first of each new crop delivered to the eastern market, frequently bring prices high enough to justify the use of a moderate-cost air freight service.[18] Many fruits and vegetables grown the year 'round in localities such as Imperial Valley, California, could be brought to the northern and eastern markets while they are still "out of season," yet remain outside the extreme luxury class where the present high cost of air transportation places them. Oysters, lobsters and fresh fish are fairly common shipments by air today, as much as a ton and a half occasionally constituting a single shipment.[19] Movement of perishable foods would be largely from west to east and from south to north, tending to offset the stronger movement of clothing and industrial products in the opposite directions. But before there can be regular, large-scale transportation of perishable foods by air, it will be necessary to solve the problem of economical temperature control in aircraft.

8. *Laundry.* This is essentially a short-haul, bulky commodity; it is safe to presume that not much of it would move by air freight.

9. *Livestock.* Although some shipments of animals for breeding purposes, pets and baby chicks are made by air express and would more likely go by air freight, the railroads would probably continue to hold almost all of this type of shipment.

10. *Miscellaneous Items.* This classification includes items not covered by the foregoing titles, such as drugs, chemicals, compressed gasses, burial cases, musical instruments, sporting goods, dyes and seeds.

A summary of the foregoing comments concerning the probable nature of air freight shipments, based upon existing rail express and air express traffic, appears in the following table:

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18. For example, just before Chrismas, 1938 California peas-in-the-pod sold for 28c a lb. in New York City and might have been rushed there by air freight, had it been available, according to several leading produce shippers in San Francisco.

19. *Express Messenger*, November, 1938.

TABLE 4

CLASSES OF GOODS LIKELY TO BE MOVED BY AIR FREIGHT

Dry Goods
Machines, Parts and Supplies
Newspapers, Printing and Advertising Materials
Perishable Foods
Cut Flowers
Miscellaneous Items

Although estimates as to the relative importance of each of the classes listed in Table 4 seem of questionable value, the opinion, based upon the foregoing analysis, may be ventured that the various classes are listed above in order of their probable frequence of shipment.

Doubtlessly some of the airlines as well as other interested organizations have from time to time made detailed inquiries into the various aspects of freight traffic demand touched upon above. But nothing authoritative has been published in the last three years. An investigation, based upon an exhaustive survey of present-day trade requirements and opinions, would contribute materially to our knowledge of the exact amount and nature of air freight traffic demand. Even without such detailed information, it seems safe to conclude that a very large demand for this type of service is latent today.

II. COSTS

The necessary expenses of an air freight service depend upon such factors as extent of route, number of schedules and type of equipment used. They may be examined under two headings, *capital costs* and *operating costs*. The former will be illustrated briefly, the latter more fully, with reference to a service over a transcontinental route.

In determining the capital and operating costs of a prospective air freight service, one of the existing transcontinental airlines, American Airlines, Inc., Transcontinental and Western Air, Inc., or United Air Lines, makes a useful object of study. The last named, a well-equipped and conservatively managed company, has been chosen for examination largely because of the availability of necessary data. A coast-to-coast service is selected because the time-saving advantage of the airplane over its closest competitor, the railroad, is greater on long than on short hauls. Time saved over train travel on a transcontinental flight may be measured in days, whereas on short stops, after allowing for the usual remote loca-

tion of airports, the advantage is only a matter of hours. Incidentally, the route of a long distance service can be selected so as to include those close-by industrial centers between which, with any time-saving at all, air traffic would be heavy. It seems likely that the first successful freight service, like the pioneer airmail line, will be over a transcontinental route such as that of United Air Lines.

It should be noted that this study supposes either: 1) a small number of exclusively freight schedules operated as a separate division of an existing major airline, or 2) a large number of exclusively freight schedules operated by a new airline. In either case, total operations are presumed to be on the same scale as those of United Air Lines in 1936, upon which the subsequent examination of operating costs is based. Since unit ground operating costs tend to decline with increased operations, i. e., number of revenue-miles flown, it is important to keep in mind the total operations involved. Whether regarded as those of an airline devoted entirely to freight or as a division of an airline offering both passenger and freight services, freight operations should be held responsible for all their own capital and operating expenses, both flying and ground, and will be so treated in the following analysis.

Before examining United Air Lines' cost figures, it should be determined whether it is more advisable to plan development of a freight service with large twin-engined monoplanes such as their Douglas DC-3's, or with smaller ones like their Boeing 247-D's. While the former, because of a much larger maximum payload,[20] is cheaper to operate per ton-mile of capacity than the latter, the Boeing 247-D has been selected herein as the type of made-over freighter most likely to be used during the next few years, for the following reasons: 1) The Boeing 247-D is now rather obsolete for passenger service requirements and should be generally available, in good condition.[21] Whether manufacturers can continue to keep the airlines supplied with sufficient high-speed tonnage to free any appreciable number of Douglas DC-3 aircraft for freight work during the next few years is not entirely clear, in view of rapidly mounting rearmament orders and steadily increasing passenger, mail and express traffic. 2) Until the existence of a large regular demand for air freight service is definitely established, it seems more advisable to use equipment which, by virtue of a smaller load capacity, could more readily be filled. If an air freight business can be

20. Approximate maximum payload of Douglas DC-3 is 6,615 pounds; of Boeing 247-D is 2,740 pounds.

21. Thus U.A.L. has during the past few years retired by lease or sale at approximately half cost most of its original fleet of about 55 Boeing 247-D's, to make way for 35 Douglas DC-3's. The expected purchase of Douglas DC-4's, Boeing Stratoliners and Douglas DC-5's by this and other airlines will tend to make more obsolescent and hence even more available Boeing 247-D's, Lockheed Electras and Douglas DC-2's.

shown likely to succeed with Boeing 247-D flying equipment, then use of the more efficient Douglas DC-3's or of large specially designed air-freighters would make profitable operations even more certain. 3) Since the original purchase price of the Boeing 247-D has been largely written off, the amount of capital investment in this kind of equipment, whether by existing or new airline, should be much less than would be necessary for the Douglas DC-3. No matter how complete one's confidence in a new untried enterprise, discretion prescribes the smallest investment practicable.

Capital Costs

If an *existing* transcontinental airline were to operate as a separate service a small number of exclusively freight schedules, it would probably have little need for new capital investment. Obsolete yet structurally sound airplanes, engines and other equipment, which had been written off in whole or in part, could be allocated to a separate freight division. An increased burden would be placed upon shop and hangar equipment, but probably not enough to interfere with passenger, mail and express business or to necessitate large additions to existing capital equipment.

A new enterprise, on the other hand, organized to operate a large number of exclusively freight schedules over one of the present transcontinental airways, would require a considerable capital outlay. Yet even this cost should amount to less than the original capital investment of comparable existing passenger airlines. Use of outmoded but structurally sound passenger equipment and of less expensive station facilities and hangar locations, would result in smaller investment expense. Operating along government-equipped and maintained airways and leasing, rather than purchasing, property wherever possible would eliminate some of the airway equipment cost with which existing airlines have been burdened in the past.

The total value of real property and equipment owned and used on United Air Lines' coast-to-coast route, as of June 30, 1938, was $7,471,392.44.[22] A *very rough approximation* of the rock-bottom investment necessary for a new transcontinental air freight business, on as large a scale of operations as that of United Air Lines in 1936, may be derived, as shown in Table 5, by making the following adjustments in United Air Lines' itemized list of properties and equipment. 1) 36 Boeing 247-D airplanes[23] at half orig-

22. Petition of U.A.L. filed with C.A.A., October 27, 1938.

23. It will be shown subsequently that an airplane in freight service would have a very low average flying speed and would consequently require less frequent maintenance and overhaul attention. Accordingly the Boeing 247-D in freight operation should average more revenue-miles of services per day

inal value and 36 spare engines at full value are substituted for figures given for airplanes and engines. 2) A proportionate adjustment is made in the figure for airplane radio equipment. 3) Elimination is made of: all items of capital cost which might be leased rather than bought, such as buildings and hangars, roads, walks and runways; improvements to leased premises; land and assets under construction. 4) A moderate amount is added for organization and developmental expense and for working capital.[24]

TABLE 5

ESTIMATED CAPITAL COSTS OF A NEW TRANSCONTINENTAL FREIGHT AIRLINE

Item	*Value*
36 Boeing 247-D Airplanes at $35,000	$1,260,000
36 Spare P & W S1H1G Engines at $9,000	324,000
36 Airplane Radio Equipment at $4,680	168,480
Shop Equipment	117,660
Airways Communication Equipment	125,301
Hangar Equipment	170,434
Motorized Vehicles	74,124
Fuel Distribution Equipment	46,409
Furniture and Fixtures	138,500
Field Lighting Equipment	30,191
Miscellaneous Ground Equipment	9,966
Organization, Developmental Expense and Working Capital	500,000
Total	$2,965,065

It should be stressed that the above figure of approximately three million dollars is a necessarily rough estimate of the total capital that a new enterprise would require to develop a transcontinental freight service on a scale as large as that of United Air Lines' 1936 passenger, mail and express business. Although initial operations would probably not require the outlay of this entire amount, it would seem advisable for competitive reasons for a new enterprise to be prepared to expend this much ultimately. Use of more efficient obsolete passenger equipment or of specially designed aircraft would, of course, alter these investment requirements considerably.

than as a passenger airplane. A 50 per cent greater average daily mileage, or 1,422 revenue-miles a day, is assumed, which indicates 36 Boeing 247-D's in freight service would fly the same mileage as U.A.L.'s 48 Boeing 247-D's actually flew in 1936.

24. Assuming that the Railway Express Agency is responsible for pick-up and delivery of freight as it is now for air express shipments, there will not be the same great need of working capital that passenger airlines have experienced.

Operating Costs

The very heart of the question of air freight's feasibility is operating expense. As seen in the consideration of demand, an air freight business is likely to succeed only if rates are offered which are much less than those in effect for air express today. Such rates cannot be offered unless operating costs are low enough to permit them. Operating costs will be considered under the following subheadings: A. *cost of present airline operation;* B. *economies of freight service operation;* C. *increases in payload of freight service operation;* D. *cost of pick-up and delivery;* E. *the resulting cost of freight service operation.*

A. *Cost of Present Airline Operation*

Since no air freight service from which useful statistics might be obtained operates in the United States today, a method of determining the probable costs thereof is to ascertain those of a typical long-distance passenger service, such as United Air Lines' and then allow for both the economies and the extra expenses of freight service operation. For 1936, the last year in which Boeing 247-D's were flown almost exclusively, United Air Lines' operating costs (not including retirements) were 56.3 cents per revenue mile.[25] The allocation of these operating costs to the various divisions of expense, both as percentages of the whole and as portions of the 56.3 cents' cost per mile, is shown in the following table. The costs have also been classified either as *flying expenses,* i. e., direct and variable, or as *ground expenses,* i. e., indirect and fixed.

TABLE 6

Distribution of United Air Lines' Expenditures in 1936[26]

FLYING EXPENSES

Item	*Percentage*	*Cents/Mile*
1. Pilot personnel	14.94	8.4
2. Fuel and oil	8.91	5.0
3. Overhaul and repair (materials)	5.14	2.9
4. Depreciation (incl. obsolescence)	14.15	8.0
5. Insurance	4.97	2.8
6. Passenger service	3.92	2.2
7. Passenger service personnel	4.08	2.3

25. *Annual Report of United Air Lines,* 1936; 58.2c in 1935. Operating cost per mile of Douglas DC-2 is 67.4c, of Douglas DC-3 is 71.6c, according to *Fortune,* February, 1939, p. 116.

26. Percentages supplied by Hal Nourse, Statistician of U.A.L., in letter of December 6, 1938. Items 7, 10 and 11 were supplied as one total percentage, which was allocated to these items on the basis of the proportions which corresponding items in the 1937 distribution of expenses bore to their total percentage.

GROUND EXPENSES

8. All other operating supplies and expenses.....	8.32	4.7
9. Sales promotion and advertising.....	8.27	4.6
10. Sales promotion and advertising personnel.....	3.06	1.7
11. All other personnel (incl. employees' Christmas gift of .44%).....	21.42	12.1
12. Taxes	2.82	1.6
Total	100.00	56.3

Table 6 provides a representative itemization of the various costs of operating a long-distance passenger service, and will serve as the basis of a study of economies possible in a long-distance air freight service.

B. *Economics of Freight Service Operation*

If United Air Lines' 1936 coast-to-coast passenger service were operated today exclusively as a freight airline, the items listed in Table 6 as *ground expenses* would probably not be changed a great deal. To be sure, because of the trend toward higher taxes since 1936, an expense such as Item 12 would doubtlessly be larger. Many of the operating supplies and expenses now come higher than they did three years ago. Yet Items 9, 10 and 11 would almost certainly decrease. Sales promotion expense would be smaller, not because of less attention to the promotion of freight traffic, but because the public can much more readily be persuaded to ship goods by air than to travel by air themselves. As for "other ground personnel," freight requires less handling than do passengers. Of course, packages do not walk onto airplanes, but neither do they ask questions, demand comforts and have to be restrained from running into whirling propellers. Hence, although there would be both increases and decreases in the various items of ground expense, it is a safe conclusion that, were United Air Lines' 1936 transcontinental passenger service operated today as a freight business, the ground costs listed in Table 6 would be no greater than those shown therein.

The seven *flying expenses* listed in Table 6 are much more productive of economies. Contrary to a widespread impression that operating costs invariably increase with decreased flying speed, very substantial savings can be made. It is, perhaps, a fair criticism of American aviation that, in the keen endeavor to reduce flying time of schedules, economy has been continually sacrificed for speed. Few attempts have been made to discover what may be gained by reversing the process. The following examination of economies possible in the seven items of flying expense of Table 6 is based in

part on an average flying speed of one-third less than that of United Air Lines' Boeing 247-D's in 1936.[27]

1. *Pilot personnel.* The first item listed in Table 6 represents the compensation of the first and second pilots, who comprised in 1936 the usual avigating complement of a passenger airplane. A fair estimate of the average annual income of a first pilot is $8,500.[28] Second pilots commence at about $190 a month, which is gradually increased to $265 over a period of three years. Reserve first pilots, who act as either first or second pilots, earn from $295 to $335 a month. These amounts, although based on recent practice, are fairly indicative of 1936 pilot pay. (Actual flying is limited, either by government or company regulations, to about 1,000 hours a year.) Since the acting second pilot is just as likely to be a reserve first pilot as a second pilot, it seems reasonable to take the average of the pay of both classes, $271.25, or $3,255 a year, as the cost of the acting second pilot. Adding this to the first pilot's salary of $8,500 a year results in a total passenger piloting cost per 1,000 flying hours of $11,755, or $11.75 an hour.

We need not expect the same highly paid piloting personnel of the passenger airliner in freight service. Responsibility for the freight airplane may be entrusted to a pilot who either has attained the rank of reserve first pilot in passenger service or has the same ability, training and experience as a reserve first pilot. To assist in piloting as well as in handling cargo, a new class of *apprentice pilot* could be set up. This class would be intended for young men who have received commercial pilot and instrument ratings, but who have not had sufficient experience to entitle them to employment as passenger second pilots. With the Government undertaking to give elementary training to 75,000 men during the next five years, a wealth of trained but inexperienced young pilots may be anticipated.[29]

The national defense program will for some time tend to reduce the supply of army-trained pilots available for civil flying.[30] Hence it is definitely in the interest of the airlines to insure some degree of independence of army reserve pilots by creating their own source

27. U.A.L.'s 1936 schedules appear to have required on the transcontinental route an average ground speed of 153 m.p.h. westbound, 183 m.p.h. eastbound. Suggested average ground speed for freight service, 102 m.p.h. westbound, 121.3 m.p.h. eastbound. *Cf.* Appendix V.

28. *Fortune*, February, 1939, p. 112.

29. Although the Government proposes to give these 75,000 men only 65 hours of flight experience, and about 200 hours of solo flying are necessary to qualify for commercial pilot and instrument ratings, it is a reasonable assumption that many students will continue training at their own expense.

30. A publication of the U. S. Army, *Flying Cadets of the Army Air Corps*, 1937, says, "It is anticipated that all graduates of the Air Corps Training Center will be needed for some time to come on tours of extended active duty with tactical units of the Air Corps." Recent national legislation confirms this anticipation.

of pilot supply. They might well devise a system whereby a qualified graduate of an approved flying school, who had secured commercial pilot and instrument ratings, could be employed as an apprentice pilot in freight service, advance after a prescribed period to second pilot in passenger service, to reserve first pilot in freight service, then to reserve first pilot in passenger service and finally to first pilot in passenger service.

It is to be expected that the Air Line Pilots Association might object to reserve first pilots' being given new responsibilities, including a preponderance of night flying, without additional compensation, as well as to the creation of an apprentice pilot group. Yet a proposal which brings about a large new demand for pilots and provides two new steps of gradually increased responsibility on the way up to the position of first pilot is ultimately in the best interest of the Association and its members. Most airline pilots frankly dread the day when, according to the necessarily exacting standards of their employers, they will have reached their age-limit of usefulness in passenger service. By finding a use for some of them as freight pilots after their retirement from passenger service there would be less waste of pilot talent to the industry and an extension of the period during which the airline pilot could make a living in the field of his training.

With an average pay of about $4 an hour for the reserve first pilot in charge of an air freighter and a salary-in-training of about $2 an hour for the apprentice pilot, one hour of freight piloting would cost $6. Since the average flying speed of the freight service would be one-third less than that of United Air Lines' coast-to-coast route in 1936, a half more time would be necessary to travel the same distance, and one and a half hours of freight piloting at $9 would be the equivalent of one hour of United Air Lines' 1936 piloting cost of $11.75 an hour. Therefore, the freight service operation economy based on Item 1 of Table 6 may be expected to approximate 23.4%, or 1.96 cents per mile.

2. *Fuel and oil.* This item of expense is influenced by flying speed for the reason that less power is required at a slower speed and therefore less fuel. Since freight service imports a considerably decreased average flying speed, the fuel saving over comparable passenger service requirements may be substantial. In the interest of simplicity, the saving in oil cost will be assumed to be included in that of fuel.

As has been stated before, the average flying speed of a coast-to-coast passenger service, such as that upon which Table 6 was based, may be decreased one-third for freight purposes. Since in

1936 the Boeing 247-D's were cruised over the transcontinental route in competition with the new Douglas DC-3's close to the Boeing's maximum cruising speed at about 180 miles per hour, the normal cruising speed of the Boeing in a similar freight service may be expected to approximate 120 miles per hour. It will be seen later that freight operation may involve an increase in the present allowable gross weight of 14,000 pounds to 16,240 pounds; at the above freight cruising speed this would make possible a decrease of brake horsepower required from 850 to 500.[31] But at one-third slower average flying speed a freight airplane would have to fly a half longer in time to cover the same distance. Hence 750 of its brake horsepower-hours would be the equivalent of 850 passenger service brake horsepower-hours. This would constitute a saving of about 12 per cent in power required.

Freight service would involve more frequent stops with a greater number of landing, take-off and climb operations than in United Air Lines' 1936 passenger service. Although this would tend to increase fuel consumption, it would not add substantially to total fuel consumption.[32] Offsetting this increase is the fact that the saving in fuel consumption would be slightly greater than the above saving in power required, because the efficiency of the more recent carburetors is greater than that of the carburetors used in 1936. Greater efficiency is possible even though the freight airplane would operate at a low power factor.[33] In view of the above considerations it is a fair conclusion that, with freight operation, fuel costs would be smaller than Item 2 of Table 6 by about 12 per cent, or 0.6 cents per mile.

3. *Overhaul and repair* (*materials*). Future costs of this kind are always difficult to estimate. The extreme complexity of the aircraft engine makes it impossible to predict what part will fail first, and when. Engines are not ordinarily operated to the point of failure, or under precisely the same conditions over long periods; therefore, an understanding of their exact reliability is difficult to obtain from experience. What material expense may be avoided with a large decrease in flying speed is particularly hard to make.

31. Based on information supplied by J. Kylstra and W. E. Beall, Chief Engineers, Boeing Aircraft Co. (CDi .0134; CDo & CDp .0273; Prop. Eff. .85), and on E. P. Warner, *Airplane Design. Performance*, N. Y., 1936, p. 635.

32. Assuming a specific fuel consumption of .85 for take-off for two minutes, of .70 for climb to cruising altitude for 18 minutes, and of .48 for cruising, approximately 10 gal. of fuel would be used for an extra take-off and climb, when operating a Boeing 247-D powered with P & W. S1H1G engines. This is to some extent compensated by decreased consumption during the glide for landing. 10 extra stops on a transcontinental flight would increase total fuel consumption about one per cent.

33. Correspondence in November, 1938, with Bendix Aviation Corp. indicates that under freight operating conditions assumed herein the new Stromberg metering injection carburetor would enable specific fuel consumption of .48 lbs. per brake horsepower-hour or less, and would not adversely affect maximum power for take-off.

One thing, however, is certain: this saving would be substantial.

Aviation engines are used most severely. Necessarily light for the power produced, they are, figuratively speaking, pounded on the back to develop sufficient power for take-off, then cruised at or close to the maximum power for which they were designed to be cruised.[34] Based upon such hard usage, the normal period between major engine overhauls, when most replacement costs occur, varies from 300 to 700 hours; for United Air Lines' Pratt & Whitney S1H1G engines in 1936, the overhaul period was 450 hours.[35]

What little comparative data exists confirms the expectation of substantially reduced maintenance material cost with a decreased cruising power factor. This is demonstrated in the following examples of overhaul practice. 1) By more moderate usage of their Pratt & Whitney S1H1G engines, after the addition of Douglas DC-3's to their fleet, United Air Lines was able to extend the prior major overhaul period of 450 hours to 600 hours. Recently the Civil Aeronautics Authority authorized Pennsylvania Central Airlines to increase to 700 hours the overhaul period of their Boeing 247-D's powered with this type of engine.[36] 2) With much of Pan American Airways' trans-Pacific flying at 40 to 50 per cent of maximum power, overhaul costs are remarkably low.[37] 3) U. S. Army Air Corps' maintenance regulations require a major overhaul every 75 to 300 hours for its severely used engines, the comparable civil models of which need such attention only every 300 to 600 hours. These cases illustrate a relatively minor change in power usage. The power usage decrease contemplated for freight operation would be much greater. Drastically diminished temperatures, pressures, inertia and friction forces and other changed conditions of slow freight operation would effect a much more impressive decrease in wear and tear than the above cases illustrate.

A helpful study of the increase in engine reliability to be expected with decrease of power usage indicates that, in a case involving as large a drop in cruising power factor as that proposed herein, engine reliability should be approximately tripled.[38] Hence,

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34. The generally advertised cruising practice of using 55 to 70% of power available is misleading, in that a larger safety factor may be construed than exists: aircraft engines are designed to be used over indefinite periods at no more than 55 to 70% of maximum power, and hence are actually cruised at about 100% of the power output indicated as safe for that particular operation by the manufacturer.

35. A. F. Bonnalie, *Air Transportation*, Boeing School of Aeronautics, 1938, p. 132.

36. According to L. Harris, Supt. of Maintenance, P.C.A., extension "was given after C.A.A. inspectors had carefully analyzed two engines which had been operating 900 hours with only routine inspection and checks." *American Aviation*, July 1, 1939.

37. Conversation with Div. Inspector of Pan American Airways' Pacific Operations, February, 1939.

38. E. T. Allen and W. B. Oswald, *Aviation*, March, 1935, p. 89. Also E. P. Warner, *op. cit.*, p. 453.

with a one-third slower cruising speed, a maintenance saving per mile of more than one-half is indicated for freight operation. This saving would be lessened somewhat, first, by increased wear and tear of extra power requirements necessitated by more frequent stops and, second, by the fact that the percentage of airplane structure maintenance economy would not be quite so great as that of the engine. Concerning these two reservations, it might be pointed out: first, that the wear and tear of extra power requirements, like the extra fuel requirements of a take-off operation discussed in the previous section, would doubtlessly constitute a very insignificant portion of all wear and tear; and, second, that airplane structure materials cost (excluding passenger equipment) was a small fraction of United Air Lines' 1936 overhaul and repair expense. A consideration of all the foregoing factors supports the conclusion that a conversion of fast passenger service such as that referred to in Table 6 to slow freight operation would result eventually in an overhaul and repair materials economy of approximately one-half, or 1.45 cents a mile.

4. *Depreciation (incl. obsolescence)*. Depreciation constitutes an appreciable portion of the cost of operating a passenger service. A large percentage of United Air Lines' total depreciation charges in 1936 was for airplanes and engines, which were written off at the rate of a four-year life with $5,000 salvage value for each Boeing 247-D airplane, and 3,000 hours of service with $500 salvage value for each Pratt & Whitney S1H1G engine.[39]

In passenger service an airplane (considered without its engines) becomes obsolete long before it wears out. This would not be true with freight service. Thus United Air Lines, after acquiring a fleet of about 55 Boeing 247 airplanes late in 1933, began to replace them in 1936 with Douglas DC-3's. Although most of these Boeings have been written off,[40] almost all of them are still in useful service today, either on United Air Lines' minor routes or on routes of various smaller airlines to which they were sold or leased. There is no reason why the life of a Boeing 247-D in freight operation should not be at least twice its 1936 depreciation period of four years.

If the Pratt & Whitney S1H1G engines can be shown to have in freight usage a total life of three times that presumed in 1936, or slightly more than 9,000 hours, a saving of 50 per cent in the engine depreciation portion of Item 4, Table 6, may be made.[41]

39. Petition of U.A.L., *supra*, and U.A.L. *Annual Report to Stockholders*, 1937.

40. Petition of U.A.L., *supra*, shows all but $121,749.85 of the cost of over two and a half million plus one and a half million for conversion into 247-D's written off, as of June 30, 1938.

41. This is the 1936 depreciation rate of 3,000 hours increased one-half

Subsequent to 1936, because of a reduction of cruising speed and consequent decrease of power factor, United Air Lines was able to increase the depreciation rate of these engines to 5,000 hours with no salvage value.[42] As shown in the discussion of fuel and oil costs, with one-third less flying speed approximately one-half of the 1936 power would be required. It is reasonable to assume that the 1936 3,000 hour life of these engines would be increased to at least 9,000 hours with but one-half as much power being produced by them.

The above economies in airplane and engine depreciation would substantially diminish total depreciation charges. It seems safe to conclude that with freight rather than 1936 passenger service on United Air Lines' coast-to-coast route, Item 4 of Table 6 would be no greater than half the amount shown therein, and the saving in depreciation expense would consequently approximate 4.0 cents a mile.

5. *Insurance.* These costs present another promising opportunity for economies in freight operation. The law permits a common carrier of goods in effect to limit its liability, but prevents a common carrier of passengers from doing likewise.[43] A shipper of goods by air express can recover no more than $50 for loss or damage to his property en route, unless a special excess charge has been paid, whereas every passenger is automatically a potential lawsuit involving many thousands of dollars. Passenger insurance costs, whether carried by the airline itself or placed with an insurance company, constitute well over half the total insurance costs.[44] In freight service operation, however, passenger insurance would be entirely eliminated, and the cost of the usual $50 per shipment limited liability cargo insurance would be relatively insignificant. Provision for the latter insurance will be made subsequently in the discussion of pick-up and delivery costs. Therefore, by eliminating all passenger insurance expense, freight service operation makes possible a saving of at least half the total insurance costs.

Of the remaining items of insurance expense, some would be no greater than in 1936 and some would be less. Thus public liability, property damage, ground equipment and employees' fidelity and life insurance costs would be no more. Full hull and crash coverage, next to passenger liability the largest class of insurance cost, is determined by the value of the airplanes. Since a freight

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because of one-third slower flying speed and doubled for a 50% maintenance economy.

42. Petition of U.A.L. *supra.*

43. G. W. Ball, "Compulsory Aviation Insurance," 4 JOURNAL OF AIR LAW 52.

44. Applying the standard passenger liability insurance rate of $.00275 per passenger-mile to U.A.L.'s 1936 average seat occupancy of 6.48 and multiplying by the 1936 revenue-miles flown, 16,616,206, indicates that passenger insurance costs in 1936 were about 61% of total insurance costs.

service can use second-hand airplanes of half the value of passenger aircraft, this item need be but one-half as much. To allow one-half, or 1.4 cents a mile, as the probable economy in Item 5 of Table 6, upon conversion from passenger to freight service, is to err in the interest of conservative estimate.

6 and 7. *Passenger service and passenger service personnel.* Ever-growing competition with train and bus has resulted in an extraordinary effort on the part of the airlines to give the utmost in comfort and convenience to their passengers. Accommodations range from dictaphones to diapers and include such items as meals, blankets, pillows, magazines, games, binoculars, slippers, stationery, electric razors and drugs. Each person must have a comfortable chair and ample leg space, there must be plenty of fresh air, artificial and natural light, oxygen for altitudes above 10,000 feet, a cabin temperature between 65° and 75° and protection from noises and vibration. In constant attendance, averaging in 1936 one for each half dozen passengers, is an accomplished hostess qualified as a registered nurse. Inasmuch as the air traveler frequently is a fastidious individual, interior appointments sometimes suggest the luxuriousness of pullman cars or ocean liners. All these expenses are unnecessary in a freight service and Items 6 and 7 of Table 6 may be eliminated entirely as items of cost herein.

The foregoing economies are summarized in the following table:

TABLE 7

ECONOMIES OF FREIGHT SERVICE OPERATION

Item	*Cents/Mile*
1. Pilot personnel	1.96
2. Fuel and oil	0.60
3. Overhaul and repair (materials)	1.45
4. Depreciation (incl. obsolescence)	4.00
5. Insurance	1.40
6. Passenger service and passenger service personnel	4.50
Total	13.91

These economies reduce the 56.3 cents per mile cost of Table 6 to 42.39 cents, which may be regarded as representative of the total operating cost per mile, exclusive of pick-up and delivery and interest on capital investment, of a typical long-distance air freight service in the United States.

Before leaving the subject of air freight economies, it should be said that the greatest savings possible lie in a direction relatively unexplored. This is the construction of airplanes designed

solely for freight use. To be sure, aircraft such as the tri-motored Ford, the Fairchild XC-31 and the Bellanca Aircruiser have been produced with half an eye to use as freighters. More recently other manufacturers, including Boeing, Douglas, Lockheed and Curtiss-Wright, have built larger faster airplanes for use either as passenger or all-cargo craft. But the former class of airplane lacks large capacity; the latter, slow-speed economy. Unless an airplane has the qualities both of large capacity and slow speed, low cost freighting is difficult. The most promising undertaking was announced by the Howard Aircraft Company early this spring: a twin-engine freighter of 1,500-2,200 total horsepower, 20,400 pounds gross weight, 8,000 pounds payload, 149 miles per hour cruising speed and wing loading of about 20 to 1. However, this interesting freight-plane has not, at this writing, been produced.

The chief requisite of freight aircraft is low operating cost. To some extent greater economy of operation can be accomplished, as is being done currently with passenger airplanes, by increasing size. Air transportation is no exception to the rule that operating costs per unit of service tend to decrease with increased size of transportation vehicle used. Larger economies, however, should result from the air freighter's low speed requirements. For high speeds, wing and surface areas must be reduced, because the chief reaction (parasite drag) of the air particles to the airplane's shape and surface varies directly as the *cube* of the airplane's speed. Considerable additional power is needed to pull the airplane through the air at an only slightly increased speed. The slow-flying freighter may be designed with large wing span and wing area, similar to a sailplane, which is the most efficient type of aircraft because it has practically no parasite drag loss and can utilize large wing span and area virtually to float through the air. With competition compelling steadily increasing speeds, the modern passenger aircraft designer is forced to utilize ever-mounting wing and power loadings, and, in point of proportion, the ultimate Wright powered table-top is not so far off. The percentage of total weight required for engine and fuel fails to diminish with increased size. Although even freight operating requirements call for a compromise between absolute aerodynamic efficiency and speed, a specially designed freighter should, in respect to both reduced power requirement and increased payload capacity, have a great advantage over its high-speed passenger counterpart. Accordingly, one may expect the operating costs of a specially designed air freighter to be definitely less than those of a passenger airliner of similar size and initial cost.

Other features required of the specially designed freighter in-

clude a fuselage with unobstructed hold, removable compartment spacers and containers, large conveniently located hatches, ring-bolts to prevent cargo from shifting, wing flaps and an efficient temperature control system. It does not seem too much to hope that before long economical Diesel engines may power large, slow air freighters, particularly on long-distance, non-stop flights.[45] Then, perhaps, flying freight cars will be as common aloft as are Diesel trucks and trailers on the highway today.

C. *Increases in Payload of Freight Service Operation*

These increases are of three kinds: conversion of certain dead weight to payload, increased allowable gross weight and improved load factor.

The modern airplane carries a most impressive quantity of fuel for its engines' consumption. In 1936 the Boeing 247-D regularly lost close to a ton of potential payload to this requirement.[46] We have seen that, because of the decreased speed required of a freight service, a given distance can be flown using approximately 12 per cent less fuel than the same airplane normally consumed in passenger service in 1936. It will be shown subsequently that a freight airliner will make at least twice as many stops as is customary in passenger operation.[47] Because of these two circumstances, the 1936 fuel load could be cut 12 per cent for the decreased rate of fuel consumption and then halved for twice as many opportunities to refuel, resulting in an average required fuel load of only 787 pounds. This supply of fuel would be sufficient under normal conditions for the 154 mile average hop shown in Appendix V and return, with three-quarters of an hour reserve supply remaining, and would, considering the shorter average hop of the freight airline, seem to provide the same degree of protection as that required by modern passenger airline fuel regulations. Freight airplanes, like the present airliners, can ordinarily take advantage of a less than 100 per cent load factor, or even reduce payload, to add to the above fuel supply when weather conditions make this advisable.[48] The increase in payload would, therefore, approximate 1,001 pounds. To this may be added a saving of 430 pounds for elimination of a stewardess and passenger fittings.[49]

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45. Diesel aircraft engines are in common use in Germany today, and have weight-power ratios which compare favorably with our gasoline engines.
46. Maximum fuel load 1,788 lbs.
47. Thus the schedule given later for a coast-to-coast service shows 20 intermediate stops with an average distance between them of 154 miles, as compared with U.A.L.'s 1936 schedules for the same route showing an average of 8 intermediate stops with an average distance between them of 330 miles.
48. *Operations Program and Policies*, United Air Lines, January, 1938.
49. McMillen, *op. cit.* (1935), p. 376, cited U.A.L.'s figure of 600 pounds for stewardess, passenger fittings and one pilot.

The gross weight for which an airplane may be certificated is limited by the weight which it can accommodate when landing at sea level with power off at the maximum speed provided for its class by Section 04.700 of the Civil Air Regulations. Payload is based upon this gross load, since it consists of the gross load minus the weight of the airplane, crew and fuel. The above Section provides that an airplane of 20,000 pounds or less may have a landing speed of 65 miles per hour at sea level if certificated for passenger transportation, but of 70 miles per hour if certificated for the carriage of goods only. Therefore, passenger airplanes, when used for freight service, may be certificated for a greater gross weight, one which is proportional to the square of the increased landing speed.[50] In the case of the Boeing 247-D, with a present certificated gross weight of 14,000 pounds, this would amount to an increase of approximately 16 per cent, or 2,240 pounds, all of which would constitute increased payload.

The question may be raised whether the increased gross weight permits a sufficiently large take-off safety factor. Airline pilots commonly use all the power available on take-off so that, should the engines fail, the forward speed would provide sufficient lift to enable maneuvering for a safe landing. At high-altitude airports, where less dense air makes necessary more forward speed for the same lift, pilots find none too much reserve power under present operating conditions. An increase in gross weight of 2,240 pounds would reduce the take-off and landing safety factor. If experience should demonstrate that the Government's freight landing speed regulation provides too small a reserve power margin, several solutions are possible: 1) take-off strips may be lengthened, or 2) a smaller single-engine airplane, such as the Bellanca Aircruiser or the Stinson SR10,[51] may be used in conjunction with regular sections to transport a part of the loads between high-altitude airports. Schedules might be devised so that one airplane could be used to supplement regular sections in alternate directions by a shuttle service arrangement.

The third increase of payload with freight operation would be due to a higher load factor for the following reasons: 1) A freight airline would not need the latest and largest type of airplane, as do passenger carriers, but could estimate the actual traffic and use the type and size of airplane commensurate with such demand. 2) A greater frequency of stops would increase the freight airline's opportunity to pick up business. 3) A freight service would not

50. E. P. Warner, *op. cit.*, p. 595.
51. Total flying cost of Stinson SR10 with over 1,000 lbs. freight payload capacity is approximately seven cents per mile, according to figures contained in letter of November, 1938, from Stinson Aircraft Co.

require as many schedules for the same amount of business as does passenger and mail service. 4) A deferred delivery arrangement, to be discussed subsequently, which provides for rate reduction in return for carriers' option to hold shipments over for a day or two, is an attractive possibility in long-distance freight operation. 5) Shipment of goods, as demonstrated by the following Table 8, is subject to smaller seasonal variation than are passenger loads. Table 8 is an analysis of the Civil Aeronautics Authority's monthly figures for revenue passengers and pounds of express carried on the airlines of the United States during the past four years, and shows the ratio of the lowest to highest monthly load in each year for both passenger and express traffic. Higher ratios, signifying less seasonal variation, are to be noted for express.

TABLE 8

SEASONAL VARIATION OF LOADS ON U. S. AIRLINES
(Percentage of lowest to highest monthly load)

	1935	1936	1937	1938	4 *Yr. Average*
Passengers	38	44	43	52	44.2
Express Pounds	47	48	71	48	53.5

During 1936 seat occupancy of United Air Lines' Boeing 247-D's averaged 64.8 per cent.[52] (Their percentages of seat occupancy in 1937 and 1938 were smaller than in 1936, which was mainly attributable to use of the larger Douglas DC-3's.) In view of the reasons cited in the above paragraph, it may conservatively be estimated that the load factor of a long-distance freight service of the kind described herein, after normal operation had been established, would be about 75 per cent. With a present payload of 2,410 pounds, conversion from dead to payload of 1,001 pounds for fuel and 430 pounds for stewardess, fittings, etc., and 2,240 pounds' increase in maximum gross weight, the total payload capacity of the Boeing 247-D would be 6,081 pounds, of which 75 per cent, or 4,560 pounds, should be the average payload.

D. *Cost of Pick-up and Delivery*

One of the greatest obstacles to the development of either air express or air freight has been the necessity of providing inexpensive yet adequate pick-up and delivery. Conceivably freight service might be merely from airport to airport with distribution and collection left to the shipper or any enterprising local agency. This ar-

52. U.A.L. *Annual Report to Stockholders*, 1936.

rangement, however, would not be acceptable to a public already accustomed to a high degree of service.

A possibility exists of collaborating with the United States Post Office Department, in order that the extensive collection and distribution facilities of that branch of the Government might be used in conjunction with an air freight service. This idea has some merit in that a new and useful service could be effected with very little cost to the public. Yet, regardless of how the Government might feel about such an expansion of the Post Office's traditional functions, it is certain that those who develop the air freight industry would prefer to remain entirely independent of federal financial assistance. Experience with air mail subsidy has shown the value of such independence.

Nearly all the airlines transporting express today in the United States collaborate with the Air Express Division of the Railway Express Agency (hereinafter referred to as R.E.A.) under separate but identical contracts, whereby R.E.A. handles pick-up and delivery in return for all out-of-pocket expenses plus one-eighth of the balance of gross air express revenues.[53] This arrangement has many advantages. The public is given an efficient, complete and coordinated express service on a single waybill to or from any point in the United States that can be reached by airline or railroad. Both the airlines and R.E.A., by an insignificant burden on existing facilities, add to their revenues.

Satisfactory as these agreements may appear to be in the present express business of the airlines and R.E.A., they are not desirable as a basis for the coordination of air freight and R.E.A. services. First, the contracts are vague, in that the portion of gross air express revenues payable to each party is dependent upon what and how great R.E.A.'s out-of-pocket expenses may be. Sound business practice disapproves of undertaking a definite service for an undetermined return. Second, the agreements require the airlines to take a greater risk, that is, of losing an airplane, and to perform a greater service, with respect to distance covered, yet entitle them to a profit only after the out-of-pocket expenses, which may be construed to cover essentially all expenses, of the R.E.A. have been provided for. This means that R.E.A., after expenses plus one-eighth of the balance, could profit on shipments for which the airlines do not receive their expenses out of the remaining seven-eighths of gross air express revenues. Third, the air carriers would have a more vital interest in the air freight business than R.E.A. and should not act as quasi-agents of the R.E.A. It would be better

53. Annual Report of R.E.A. to Railroad Comm. of Calif., 1938.

for R.E.A. to act as agent of the airlines, as it does for the railroads; or at least the airlines should be independent contractors, as is Pan American Airways in its relationship with R.E.A. Finally, R.E.A., a corporation entirely owned by the airlines' chief competitors, is in a position to be suspected of stifling development of the air transportation industry. This suspicion has been voiced in some quarters and the claim made that from the promotional angle air express is not getting its fair share of attention.[54] Such an attitude, however unfounded and regrettable, is to be expected with the present arrangement and constitutes an undesirable reflection upon the integrity of R.E.A.

Supposing the air freight carriers were to employ R.E.A. as their agent to collect and deliver parcels for a flat charge per pick-up and delivery, what should that charge be? At present R.E.A., under the above described contracts, gets slightly more than one dollar for each pick-up and delivery,[55] which is approximately 36.4 per cent of the average amount of tariff paid by the shipper. Without raising the question whether an arrangement which results in the division of total gross air express revenues on the basis of one-third to R.E.A. and two-thirds to the express air carrier is fair, in view of the relative values of service of and burdens on each, the opinion is ventured that the flat pick-up and delivery charge of R.E.A. ought not to be so high as one dollar for an air freight service. In most large cities, local trucking or express service is available for much less than a dollar. R.E.A. itself provides local express service for wholesalers and retailers, which ordinarily involves an intermediate delivery and pick-up to its own clearing warehouse, at a rate which varies according to the city but which usually approximates 25 cents for 40 pounds and a slightly lower rate for heavier shipments. Special handling to insure prompt delivery costs an additional 50 cents, making a total charge, in the case of special delivery from and to such remote places as the usual airport, of 75 cents per pick-up and delivery (assuming the average weight of air freight shipment to be less than 40 pounds). One other element of cost must be provided for in the flat charge. The present arrangement between R.E.A. and the air express carriers requires the former to be responsible for claims for losses under the $50 free insurance coverage given for each air express shipment. Moreover, in the previous discussion of insurance costs, it was stated

54. Editorial, *American Aviation*, November 1, 1938.

55. Assuming total air express revenue in 1937 was product of 624,048 (total shipments) and $2.88 (tariff for average shipment of 6.87 lbs. and 850 miles). Of this, $1,152,971 was paid to airlines (Annual Report of R.E.A. to Railroad Comm. of Calif., 1937). Balance, amounting to $1.05 per shipment, or 36.4% of tariff, must have been the share of R.E.A.

that cargo insurance would be dealt with as an element of pick-up and delivery expense. Since R.E.A.'s regular insurance charge to the public for either rail or air express shipments is 10 cents per $100 valuation, an additional allowance of 5 cents for the $50 free insurance would seem to be adequate. Therefore, the total flat charge for an air freight pick-up and delivery up to 40 pounds should be no more than 80 cents. This is slightly less per shipment than R.E.A. receives at present in the air express business, but, with a large increase in this type of business reducing unit cost of handling, it is probably high enough to permit R.E.A. a profit. Together with the other economies indicated herein, it would make possible the air freight rates necessary for a considerably increased business both for the air carriers and R.E.A.

The alternative to the above arrangement is for the air freight carriers to set up their own delivery system throughout the United States. Even a pioneer air freight service such as that referred to herein may expect, using local trucking, parcel delivery and telegraph messenger services to provide adequate collections and distributions at an average cost of about one dollar. Later, an express agency, similar to R.E.A. but independent of the railroads, could be set up for the benefit of all the air carriers including, too, air express services. The recently instituted Civil Aeronautics Authority, which has already evinced an interest in this matter, could be most useful in compelling the necessary unity of action among all the airlines.

However, the public interest clearly requires the avoidance of duplicating existing delivery facilities if possible. It would also seem to be in both R.E.A.'s and the airlines' interest to encourage the same cooperative relations in regard to the future freight business as those which exist in the air express enterprise today. Therefore, it seems likely that terms something like those suggested above would be agreeable to all concerned.

E. *Resulting Cost of Freight Service Operation*

The foregoing analysis of the costs and possible economies of a freight service based on United Air Lines' coast-to-coast route and 1936 passenger service may serve as an indication of the total operating cost of any long-distance air freight service. Starting with the known cost of operating a passenger-mail-express service and making deductions for various economies possible with freight operation, it was found that the total cost per mile, exclusive of pick-up and delivery, amounted to 42.39 cents.[56] Taking again as the

56. *Cf.* p. 475.

average payload 4,560 pounds, the 42.39 cents a mile cost amounts to .0093 cents a pound-mile. Pick-up and delivery expense has been estimated at 80 cents per shipment. With present express shipments averaging 6.87 pounds and 850 miles and an air freight tariff decidedly favoring heavier and longer hauls, a reasonable estimate of the probable weight and distance of the average air freight shipment is 15 pounds and 1,250 miles, or 18,750 pound-miles. This would result in pick-up and delivery costs of .0043 cents per pound-mile. Therefore, the total operating cost, exclusive of interest on capital investment, of a long-distance air freight service, using Boeing 247-D aircraft under the conditions outlined in the foregoing study, may be expected to average approximately .0136 a pound-mile, or 27.2 cents a ton-mile.[57]

III. Rates and Profits

The probable large demand for an air freight service and the possibility of its operation at low cost having been determined, air freight rates must be found which will not only cover all expenses but provide reasonable profit as well. Rates will be considered applicable to all air freight, regardless of the distinction made in the study of costs between operations of an existing major airline and those of a new airline. The subject of profits, however, will be discussed briefly with these alternatives in mind.

Rates

A suitable rate structure will be analyzed under the following five sub-headings: A. *basic rates;* B. *space;* C. *value;* D. *special classes;* E. *deferred delivery.* Because of lack of precedent in establishing air freight rates, any tariff would be necessarily experimental, and the most useful rate structure is one capable of future readjustment in whole or in part. A general tariff level is necessary, which, although low enough to induce adequate traffic, will produce sufficient income to cover all expenses plus a reasonable profit. And, not of least importance, the basic tariff structure should be quite simple, in order that it may be understood clearly and applied easily by freight-line employees as well as the entire shipping public.

57. The larger payload and economies possible with airplanes such as the Douglas DC-3 would result in a considerably lower cost per pound-mile. Applying the same percentages of economies in flying expenses shown in Table 6 to the 1938 operating expenses of U.A.L., more than three quarters of whose flying is performed with Douglas-3's, results in an operating expense of 53.44 cents per mile. Maximum payload is 6,615 pounds, increased allowable gross weight 3,720 pounds and elimination of non-essential furnishings, etc., 716 pounds. Computing as above with load factor 75 per cent indicates a freight service cost, exclusive of interest on capital investment, of .0107 cents per pound-mile, or 21.4 cents per ton-mile.

A. *Basic Rates*

In existing rail and air transportation tariffs one might expect to find a suitable framework for air freight rates. However, anybody who has had occasion to make shipments by rail, either of freight or express, would probably advise against encouraging the new air freight industry to follow in the rate-making footsteps of the railroads. The amazing, expensive mass of rates, provisions, regulations and decisions, which fill thousands of volumes, create endless bitter controversy and can be applied only by relatively few experts, has to no little extent helped make this proud giant one of the nation's sickest industries. Necessary or useful as this complicated set-up may be to the railroads today, air freight transportation would be wise to reject all the blocks, sub-blocks, scales and other ramifications of the railroad tariff structure.

The present domestic air express tariff, shown in part hereinafter in Appendix I, provides a more promising rate pattern. Its rate structure is much more quickly and easily comprehended than that of rail express. The rates of this tariff increase with distance and weight, until certain limits are reached where either no further charge is made for greater mileage or a flat charge, depending upon the distance classification, is made per pound. Of importance to both shippers and carriers as well as to the student, as probably the best indication of the relative rate burden of every class of shipper, is an analysis of this tariff in terms of rates per pound-mile of shipment. This is made in Appendix II, which shows that the air express pound-mile rate decreases with weight and distance at a gradually diminishing rate until certain distance-weight classifications (represented by the heavy type) are attained, where a flat rate of .04 cents per pound-mile is charged. At 2,450 miles the rate resumes its decrease again, this time with distance only.

In adapting the present air express tariff to the requirements of air freight, four changes seem desirable: 1) simplification, 2) greater advantage to long-distance shipments, 3) a more widespread decrease of the pound-mile rate with increased weight, and 4) a lower average pound-mile rate. These objectives are accomplished by the basic rates suggested in the following Table 9. An air freight tariff and pound-mile analysis thereof utilizing this rate basis are shown subsequently as Appendices III and IV respectively.

TABLE 9

SUGGESTED AIR FREIGHT BASIC RATES

	Distance Zones		
Weight	To 1000 *miles*	1001-2000 *miles*	2001-3000 *miles*
Up to 10 lbs.	$1.50	$2.50	$3.50
Each lb. over 10 lbs.	.15	.25	.35

This rate basis offers an innovation in transportation tariff structures. A flat rate per pound, with all weights below 10 pounds considered as 10 pounds, is offered in each of three distance zones. This principle has long underlain the United States postal rate structure, helping make possible the remarkable economy and efficiency of that service, which most people now take for granted. The idea has also been adopted for some telegraph charges and is being vigorously advocated for railroad passenger and freight tariffs.

The cardinal virtue of the postalized-rates principle is the ease with which the tariff can be applied, understood and advertised. Simplicity and the spreading of the costs of service among a large class of patrons are the substance of the idea. Economy is achieved by avoidance of all the varied expenses which grow out of the establishment and application of rates. Strong psychological appeal can be made by emphasizing the maximum distance obtainable with each flat rate, in advertising slogans such as, "Air Freight to *Any* State—ten pounds from $1.50 to $3.50." The flat-rate principle, which after all differs from other tariffs only in the degree of importance attached to the elements of distance and weight, may be used throughout the tariff, as in Table 9, or may be restricted to the lower weight classifications. Thus four or more zones might be substituted in place of the three suggested. Or the flat-rate feature might be abandoned after 10 pounds, up to which point the principle has its maximum usefulness.

The four changes suggested by the study of the air express tariff structure are fulfilled in the following ways. 1) The tariff is completely simple and understandable, as shown by a comparison of Appendices I and III. 2) A greater advantage lies with more distant shipments, which results automatically from application of the flat-rate principle in each of the distance zones, as is demonstrated by the pound-mile analysis of Appendix IV. The lowest pound-mile rates appear where they are most wanted, viz., for coast-to-coast shipments of 10 pounds or over, and thus tend to improve load factor by encouraging long, heavy hauls. 3) A more widespread decrease of the pound-mile rate with increased weight (up to 10 pounds) in the suggested air freight tariff may be seen by comparing the pound-mile analysis of the air express rates, shown in Appendix II, with that of the air freight tariff, shown in Appendix IV. The former analysis reveals that the air express pound-mile rate for more than half of the classifications (represented by heavy type) is the same for all weights in any given distance classification. This has the effect of offering no inducement to shippers to integrate shipments. Thus a consignor may send separately to a

transcontinental destination 12 two-pound packages for the same price he would pay if he were to unite them into one 24-pound parcel, before shipment. But the difference in expense to the airlines and to R.E.A. is very great: when the packages are sent separately, they involve 12 times as much handling and insurance responsibility. Appendix IV shows that the suggested air freight tariff offers decreasing pound-mile rates up to 10 pounds in all distance classifications. Beyond 10 pounds there is less incentive for offering decreasing pound-mile rates. 4) A comparison of the same two appendices shows that the fourth objective has been attained, viz., a low average pound-mile rate. The average rate of 30 cents a ton-mile, or .015 cents a pound-mile, indicated in an early part of this study as necessary to attract the large latent demand for air freight, appears to be offered *approximately* in the suggested tariff. If, however, the average rate should prove too high (an effort has been made to suggest rates slightly higher than are needed for an .015 cents per pound-mile average), subsequent readjustment downward may be accomplished easily by altering the particular amounts proposed. Protection against possible loss on the average pound-mile rate is made evident by Appendix IV, which shows that only on shipments of over 2,850 miles and 10 pounds is there a pound-mile rate of so little as .012 cents. This amount is only a trifle less than the rate shown in the study of costs to constitute the break-even point and it is easily counter-balanced by the preponderance of pound-mile rates greater than the break-even rate in the balance of the tariff.

A comparison of the suggested air freight rates with the present air express tariff indicates that the airlines' profitable express business is challenged severely only in the heavier long-distance classes, from which as has been shown air express derives little business today. The following Table 10 illustrates the relation of rail express and air express rates to those suggested for air freight between various important cities.

TABLE 10

ILLUSTRATIVE AIR EXPRESS, RAIL EXPRESS AND SUGGESTED AIR FREIGHT RATES

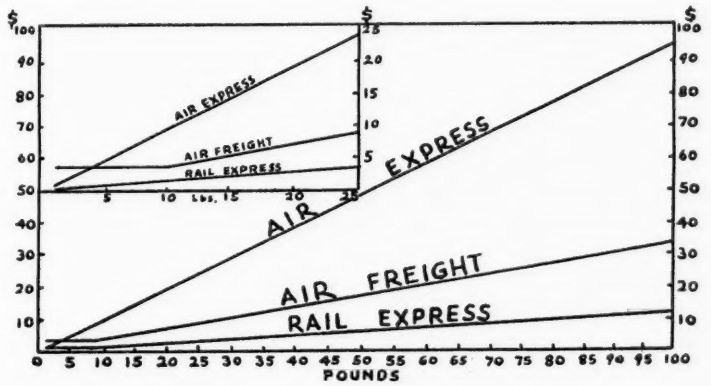
10 lbs.	*New York to:* *Chicago*	*Kansas City*	*Los Angeles*	*Chicago to:* *San Francisco*
Rail Express	$0.65	$0.70	$1.40	$1.15
Air Express	3.12	4.92	9.60	8.00
Air Freight	1.50	2.50	3.50	2.50

	New York to: *Chicago*	*Kansas City*	*Los Angeles*	*Chicago to:* *San Francisco*
25 lbs.				
Rail Express	1.15	1.52	3.33	2.72
Air Express	7.00	12.00	24.00	20.00
Air Freight	3.75	6.25	8.75	6.25
100 lbs.				
Rail Express	4.18	5.67	12.92	10.45
Air Express	28.00	48.00	96.00	80.00
Air Freight	15.00	25.00	35.00	25.00

Competition of air freight with air and rail express is most likely in the long-distance heavy-weight classifications. Figure 1 illustrates graphically the relationship of the transcontinental rates of these services up to 100 pounds.

FIGURE 1

AIR EXPRESS, RAIL EXPRESS AND SUGGESTED AIR FREIGHT TRANSCONTINENTAL RATES
(Curves Approximate)



The above Table 10 and Figure 1 demonstrate in a small way that, without the ramifications of the railroad express tariff and without all the detail of the air express tariff, an effective air freight rate structure is possible. This may be achieved by application of the flat-rate principle. It is to be hoped that those who develop air freight transportation will see fit to use this principle, either in whole or in part.

B. *Space*

Another problem in setting up a suitable air freight tariff has to do with an airplane's limited amount of space. The airplane as a vehicle of transportation is a relatively small unit, with high initial and operating costs. When the demand for space exceeds that which is available, we cannot simply hitch on another box car or trailer; a new unit, complete with power plant, crew and all the equipment of the first, must be provided. In order to operate economically, the freight airplane's load factor must be made as high as possible. High revenue yielding shipments of proper density must not be sacrificed for bulky, low revenue yielding packages. This is why the Domestic Air Express Tariff provides that a shipper shall be allowed 400 cubic inches of space per pound of shipment and shall be charged one pound for each 400 cubic inches in excess thereof. Similarly the Pan American International Air Express Tariff has a space limitation of 200 cubic inches per pound.

Streamlining and other aerodynamic considerations cause space rather than weight to be at a premium in the present-day airplane. Since, as we have seen, freight operation enables an increased payload, the space-weight ratio for a converted passenger airplane is likely to be especially low. Thus the Boeing 247-D, with a total payload capacity of freight use of 6,081 pounds[58] and an available cabin space of about 462.9 cubic feet,[59] would, allowing sufficient passage-way, have a space weight ratio of 131.8 cubic inches per pound. The Douglas DC-3 with available cabin space, less passage-way, of about 1,320 cubic feet would have a space-weight ratio of 206.4 cubic inches per pound. Although the future may bring aircraft of radically different design, it seems hardly likely that a ratio much greater than that of the Douglas can be counted upon for many years to come.

Fortunately the vast majority of commodities that might be transported by air freight have space-weight ratios less than that of the airplanes just considered. The following list illustrates the space-weight ratios for a few common materials in cubic inches per pound:

Steel 3.5	Water 27.4
Glass 9.6-11.5	Paper 39.3-24.0
Sugar 17.3	Cork 110.8

Only an exhaustive investigation would show what space might be occupied by various commodities when properly packed for shipping.

58. *Cf.* p. 479.
59. By actual measurement. Unnecessary fuel space would increase this a little. Use of space in after portion of fuselage presupposes alterations to provide for shifts in center of gravity and to prevent interference with tail controls.

The following Table 11 shows the space required by three of the bulkiest types of commodities which are at present shipped either by rail or air express, but which might be expected to move by air freight.

TABLE 11

SPACE-WEIGHT RATIOS OF COMMODITIES PACKED FOR SHIPPING

Commodity	*Package Dimension*	*Weight*	*Ratio*
Fruits and Vegetables	*(in.)*	*(lbs.)*	*(cu. in./lb.)*
Asparagus	19½x10½x10	34	60
Grapes	17½x16x5	28	50
Ripe figs	20x14x7	40	49
Unshelled peas	23x12x9	30	79.6
Clothing			
Dresses	28x16x4	12	149
Dresses	34x16x3	9.5	161
Cloaks	33x19x8	33	152
Coats	28x16x6.5	16	182
Cut flowers			
Roses	36x16x9	25	207
Gardenias	32x18x4	6	384

From the above table it appears that a tariff provision allowing 200 cubic inches per pound and charging one pound for each 200 cubic inches in excess thereof would be a just and practicable limitation. Only unusually bulky items such as some of the more expensive cut flowers, which now move in quantity by air express, and some loosely packed merchandise would be adversely affected. Since the space-weight ratio of all shipments on any single trip would probably average well below 200 cubic inches per pound, the small space of aircraft such as the Boeing 247-D may be expected to be adequate for this proposed space-weight limitation under normal conditions.[60]

C. *Excess Value*

Value as a factor in determining a rate schedule merits consideration. For a given size, weight and distance of shipment, the transportation of an article of much value in a sense constitutes a greater service than the transportation of one of less value. An additional fee might be charged for this greater service. Thus Pan American Airways charges anywhere from 5 to 50 cents per $100

60. Pan American's trans-Pacific express shipments do not often exceed the 200 cu. in. limit. Conversations with H. Brundage, P.A.A., San Francisco office.

valuation of shipment in addition to the regular tariff and insurance costs for its foreign express service.[61]

Common carriers are by law absolute guarantors of the safety of goods in their custody. They can and do to a large extent minimize this obligation by establishing double rates: i. e., the usual one, for which their maximum liability per shipment is limited to a fixed amount such as $50, and a special rate, by which the shipper pays an additional charge and gets full value protection. In the case of R.E.A. on either its rail express, air express or combined rail-air express business the additional charge amounts to 10 cents per $100 valuation up to $25,000 valuation per shipment.[62] This excess charge can be made to reimburse the carrier not only for the extra insurance risk but also for the greater value of the transportation service.[63] Although shippers, by failing to declare full value, could avoid their share of excess value charges, it is a reasonable assumption that most shippers of valuable goods do pay the special rate for full protection. It would seem preferable in the long run to combine any excess value rate-element with the extra insurance charge rather than to complicate further the air freight tariff by separate excess valuation and insurance fees.

D. *Special Classes*

In discussing the subject of the demand for an air freight service and the necessity of keeping the airplane's load factor high, mention was made that specially low rates might be necessary to aid traffic in a particular direction. Thus on a coast-to-coast run lighter loads may be expected in an east-bound direction. To offset this, one or more special classes, similar to those provided for in the Railway Express Tariff, at 60 or 75 per cent of regular rates, could be set up for certain commodities such as cut flowers and tree-ripened fruits. At present, the Air Express Tariff offers special rates of 60 and 75 per cent of regular rates on racing forms and 60 per cent on newspapers.[64] Special rates should, of course, be applied cautiously and be invoked only where it has been demonstrated that the airplane would otherwise not be fully loaded. Actually this service would be offered at less than the cost of operation and be intended only to cut down loss on the less profitable portion of the business.

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61. C.A.A. No. XP-1. This results in the unhappy situation of the shipper's being billed for three separate charges.

62. Air Express Tariff, C.A.A. No. 1, Rules 3 and 12.

63. That the 10 cents per $100 is large enough for this double purpose is a fair inference from the fact that the standard airline trip life insurance rate (four hours) is at the rate of only one-half cent per $100.

64. Air Express Tariff, C.A.A. No. 1, Supplement 3.

E. *Deferred Delivery*

Before leaving the subject of rates, emphasis should be placed upon the importance of a long-distance deferred delivery service at reduced rates. This could be either in conjunction with or in addition to the above Special Classes. By charging a portion of regular rates and undertaking only to deliver in less time than is possible by rail express, the load factor could probably be kept very high and hence the operations made extremely efficient. Possibly a discount which fluctuated from season to season from 75 to 50 per cent, as operations warranted, would be practicable. On a coast-to-coast service, a 50 per cent reduction in the previously suggested rates would make many of them just slightly higher than or equal to those of rail express. With the assurance that goods would be delivered at least one or two days sooner than the rail express time of delivery, many long-distance shippers would be glad to take advantage of a deferred delivery service. The air freight carrier would be able to draw upon accumulated deferred delivery shipments to fill out unused space or load and thus improve the efficiency and profits of its operations.

One may cite here the amazing growth of Transportes Aereos Centro-Americanos Ltd.'s freight operations, due in large measure to a low-rate, deferred delivery service.[65] This one company handles in six months as much commodity traffic as do all the airlines of the United States in a year. The time advantage of long-distance air freight over rail express in the United States, although by no means so great as that of TACA over Honduran mules, is nevertheless considerable. The amount of industrial traffic in the United States that waits to be tapped by an air freight service with rates approximating those of rail express is so vast as to make the situation here almost as attractive as that in Central America.

The foregoing suggested general provisions, relating to the basic rates, space, value, special classes and deferred delivery, are presented in the air freight tariff shown in Appendix III.

Profits

The development of an air freight service involves so many assumptions and variable factors of importance that a discreet silence on this subject might seem advisable. But if private capital is to have the responsibility of creating this new industry, it must first be shown that the business would be profitable.

Throughout this study, assumptions have had to be made or

65. H. B. Deutsch, *Saturday Evening Post*, December 3, 1938.

borrowed regarding matters for which concrete data or information was unobtainable. Since each one has a significant bearing on the question of profits, it seems fair to summarize at this time the more important of them. 1) At rates two or three times those of rail express, the demand for air freight service would be very great, with shipments averaging 15 pounds and 1,250 miles. 2) The airplanes used would be of the same general type and operating efficiency as the Boeing 247-D, and, in the case of a new airline, sufficient aircraft would be available to enable operations on as large a scale as those of United Air Lines in 1936.[66] 3) The Railway Express Agency would cooperate with the freight airlines as it now does with passenger airlines but on the basis of 80 cents per pick-up and delivery (up to 40 pounds). 4) The load factor would average 75 per cent.

The above assumptions, as well as the various data and material referred to throughout this study, justify an opinion that large profits may be expected in the operation of a long-distance air freight business. In the study of costs, the expenses of operation, exclusive of interest on capital investment, were found to total .0136 cents a pound-mile. In the consideration of a suitable rate structure a tariff was suggested that, in the classifications where business was expected, averaged about .015 cents a pound-mile. This indicates a profit of about .0014 cents a pound-mile. Total operating profit would depend upon the number of revenue-miles flown. The cost of interest on capital investment would be an additional consideration in the case of a new airline. But, whether new air freight company or established airline, an appreciable annual profit is indicated.[67]

The purpose of this section was not so much to demonstrate how great profit could be made in the air freight business as to show that ultimately this phase of air transportation may become one of the nation's most profitable industries. It was intended, also, to point out that established major airlines are in a very favor-

66. In the case of a new airline, freight revenue miles equal to those of U.A.L. in 1936, calling for 36 freight airplanes (*cf.* Table 5), have previously been assumed to enable operating costs similar to those of an existing major airline. To the extent that ground costs decrease with flying costs and that the profits indicated for a new airline in the following footnote may be sacrificed, a lesser number of Boeing 247-D's Lockheed Electras and Douglas DC-2's would be required.

67. On a single daily round-trip transcontinental schedule, such as that suggested in Appendix V, 2,263,000 revenue-miles would be flown annually. With an average payload of 4,560 pounds, business would amount to 5,152,858 ton-miles, for a total profit of approximately $144,000. This is the indicated annual profit of an existing major airline for each transcontinental schedule, involving only five or six obsolete Boeing 247-D's, Lockheed Electras or Douglas DC-2's. A new airline would have to operate a larger number of freight schedules, calling for interest on a large capital investment. Assuming half the capital listed in Table 5 were borrowed at six per cent and seven daily round-trip schedules such as that suggested in Appendix V were made, the profit per round-mile would be .013 cents, and the total annual profit about $937,000. The 36,000,000 ton-miles of air freight traffic envisaged by the latter business is a striking amount, but it is well within the 50,000,000 ton-miles of air commodity traffic forecast many years ago by Mr. Warner (*cf.* p. 457) as possible with low rates.

able position to experiment with and develop this service, A new air transport company should not expect to succeed in this sort of enterprise without entering upon it on a grand scale and risking a large amount of capital.

IV. Routes and Schedules

No study of the practicability of long-distance air freight in the United States is complete without consideration of the subject of routes and schedules. These will be discussed briefly and separately below.

Routes

It has been shown that the demand for air freight service is greatest between remote portions of the country, where the time saving advantage of air transportation over surface facilities can be counted in days. We have seen, too, that there is a great advantage in selecting a route which connects as many prosperous, populous communities as possible—especially cities of great industrial importance. Stops at such centers increase the opportunity of picking up business and enable more frequent refuelings, thus reducing the amount of payload that must be sacrificed to dead load, and permitting a more discreet apportionment of piloting time among the flying personnel.

The present long-distance air routes, although intended primarily for passenger and mail needs, offer satisfactory paths for air freight operations. Such routes present a series of existing airports, intermediate emergency landing fields and conveniently located alternate airports, all with adequate facilities for large airplanes. Established airways are properly maintained, usually by the federal government, with necessary avigational aids, the expense of supplying which would be prohibitive to almost any private airline. When fully developed, an air freight system would doubtlessly supplement that of air express throughout the entire country and in that connection would make use of all important airways. For a beginning, however, development of air freight along the nation's present chief long-distance routes is advisable.

Routes are sometimes classified as either primary, of major traffic importance, or secondary, of minor traffic importance.[68] Although opinion may differ as to the helpfulness of this distinction, the terms are used here to emphasize that operation over some routes, i. e., primary, would be entirely independent of operation on other routes.

68. This distinction appeared in the Air Mail Law of 1934, Par. 8123, Sec. 2d.

Figure 2 shows five primary and one secondary routes. The first four are transcontinental and have been suggested by the present routes of: 1) Northwest Airlines, Inc. and American Airlines, Inc.; 2) United Air Lines;[69] 3) Transcontinental and Western Air, Inc.; 4) American Airlines, Inc., respectively.[70] The fifth and shortest primary route is based on that of Eastern Air Lines from Brownsville, Texas to New York; its importance lies in connecting the eastern seaboard with the industrial south. The route from Brownsville, Texas to Chicago, based on Braniff Airways' present system, is a most important secondary line since it ties together all five primary services and traverses nearly the entire center portion of the country from north to south. In each case slight changes from existing itineraries have been made, either to include additional stops of importance or to reduce the distance between stops.

SCHEDULES

Few aspects of air transportation are more subject to continual experimentation and change than are schedules. Few aspects are more important. Quantity and nature of traffic demand, kind and amount of equipment and weather are all important factors which must be considered. To the extent that performance can be controlled and systematized, a detailed time-table is of utmost importance in achieving punctuality and reliability of service.

As an example of what kind of service a freight airline may be expected to offer with an average flying speed one-third less than that of passenger service, Appendix V provides a time schedule for the previously suggested Primary Route No. 2. Allowing ample time for ground maneuvering at each airport,[71] for loading and unloading,[72] for refueling[73] and for maintaining an average ground speed of about two-thirds that of United Air Lines in 1936, viz., 102 miles per hour westbound and 121.3 miles per hour eastbound, the suggested schedule shows a transcontinental service of approximately 34 flying hours. By arranging a departure from each terminus at 9 or 10 o'clock in the evening, making possible an early arrival at the other terminus on the second day thereafter, a trip

69. An alternate route is shown between Omaha and Cheyenne for Route 2, which could be effected advantageously after traffic developed sufficiently to justify two schedules each way daily or by the shuttle service discussed on p. 478.

70. Of interest are the populations (1930 census) per mile of each route: 2,945, 6,235, 4,557, 5,001, respectively. For the 5th primary route population per mile is 5,936; for the secondary route is 2,689.

71. Lockheed Aircraft Corp. in its exhaustive analysis "Operating Costs," May 21, 1937, allows 7 minutes' maneuvering time between stops. 8 minutes are allowed in the suggested schedule here.

72. From 5 to 15 minutes are ordinarily necessary per stop in passenger service. 10 minutes are allowed in the suggested schedule.

73. The relatively small gasoline requirements would enable quick refueling by trucks capable of pumping gasoline at the rate of 50 gallons per minute.

can be made with the loss of but one working day to the shipper. Between New York and Chicago this arrangement provides a very satisfactory overnight service as well. Industrial people, who, as previously shown, may be expected to form the largest class of shippers, could be offered transportation that would be but slightly slower than air express (from the viewpoint of working days lost) and three times as fast as rail express.

Until operation can be had with safety in practically any kind of weather, air transportation must continue to be somewhat handicapped in competition with ground transportation. Facilities are being installed at many major airports for landings entirely by instrument. But until these improvements are perfected, air transportation must continue to make use of surface conveyance when adverse weather conditions make flights unsafe. Considering the progress of the past few years, it is reasonable to believe that before long reliability of air schedules will fairly closely approach that of surface transportation.

Conclusion

Based upon the foregoing study of the feasibility of air freight operations within the United States, the following conclusions may be upheld with a high degree of confidence. A very substantial demand for rapid and cheap transportation by air of heavy bulky goods is latent, particularly over long distances and between industrial centers of large population. The types of commodities that are likely to be shipped by an air freight service are: dry goods, mechanical parts and supplies, printed matter, perishable foods and cut flowers. The first three classes may be expected to move mostly from the large industrial centers of the east westward, or from north to south, and the last two classes in the opposite directions.

It seems reasonably certain that by various economies, such as use of sound but obsolete passenger equipment, slow flying speed, frequent stops and complete divorcement from the high cost of passenger service, operating expenses of either an existing or future major airline would permit rates which should attract a large amount of traffic. Not only would special governmental financial assistance be entirely unnecessary, but operations on a profitable scale may reasonably be expected.

Just one hundred years ago, when the railroad business was still a puny, struggling enterprise, an obscure business man by the name of W. F. Harnden conceived the idea of employing this then newest and speediest means of transportation for the rapid shipment of "small packages, goods and bundles" between New York

and Boston. People, who knew better, smiled. At first Mr. Harnden was able to carry all shipments in his carpet-bag. Now that carpet-bag service has developed into a nation-wide business each year handling over 140,000,000 shipments, yielding about $150,000,000 in revenues and employing directly more than 57,000 persons. The enterprise is known as the Railway Express Agency.

Reference to this phase of transportation history seems quite in place, because aviation, in some of its branches, shows promise of duplicating the mighty growth of the railroads. Free of the staggering burden of maintaining expensive roads, rights-of-way and ponderous equipment, the airplane may yet prove inherently less costly to operate over long distances than any type of surface transportation vehicle. Shipment of goods by air may indeed become an activity of so vast proportions as to have an important effect on the rate and direction of social progress itself. Whether or not it ever attains this degree of importance and usefulness, a careful consideration of the facts available indicates that the development of a profitable unsubsidized air freight service in the United States today is an entirely feasible proposition.

APPENDIX I
DOMESTIC AIR EXPRESS CHARGES (In Cents)*

APPENDIX I

Domestic Air Express Charges (In Cents)*

Distance Zones**

POUNDS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1¼	100	100	100	100	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	120
1½	100	100	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	144
1¾	100	100	102	105	108	111	114	117	120	123	126	129	132	135	138	141	144	147	150	153	156	159	162	168
2	100	100	104	108	112	116	120	124	128	132	136	140	144	148	152	156	160	164	168	172	176	180	184	192
2¼	100	101	106	111	116	121	126	131	136	141	146	151	156	161	166	171	176	181	186	191	196	201	207	216
2½	100	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	230	240
2¾	100	103	110	117	124	131	138	145	152	159	166	173	180	187	194	201	208	215	222	229	236	243	253	264
3	100	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	276	288
3¼	100	105	114	123	132	141	150	159	168	177	186	195	204	213	222	231	240	249	258	267	276	286	299	312
3½	100	106	116	126	136	146	156	166	176	186	196	206	216	226	236	246	256	266	276	286	296	308	322	336
3¾	100	107	118	129	140	151	162	173	184	195	206	217	228	239	250	261	272	283	294	305	316	330	345	360
4	100	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	352	368	384
4¼	100	109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	357	374	391	408
4½	100	110	124	138	152	166	180	194	208	222	236	250	264	278	292	306	320	334	348	362	378	396	414	432
4¾	100	111	126	141	156	171	186	201	216	231	246	261	276	291	306	321	336	351	366	381	399	418	437	456
5	100	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	400	420	440	460	480
5½	100	114	132	150	168	186	204	222	240	258	276	294	312	330	348	366	384	402	420	440	462	484	506	528
6	100	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396	416	436	456	480	504	528	552	576
6½	100	118	140	162	184	206	228	250	272	294	316	338	360	382	404	426	448	470	494	520	546	572	598	624
7	100	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	532	560	588	616	644	672
7½	100	122	148	174	200	226	252	278	304	330	356	382	408	434	460	486	512	540	570	600	630	660	690	720
8	100	124	152	180	208	236	264	292	320	348	376	404	432	460	488	516	544	576	608	640	672	704	736	768
8½	100	126	156	186	216	246	276	306	336	366	396	426	456	486	516	546	578	612	646	680	714	748	782	816
9	100	128	160	192	224	256	288	320	352	384	416	448	480	512	544	576	612	648	684	720	756	792	828	864
9½	100	130	164	198	232	266	300	334	368	402	436	470	504	538	572	608	646	684	722	760	798	836	874	912
10	100	132	168	204	240	276	312	348	384	420	456	492	528	564	600	640	680	720	760	800	840	880	920	960
11	100	136	176	216	256	296	336	376	416	456	496	536	576	616	660	704	748	792	836	880	924	968	1012	1056
12	100	140	184	228	272	316	360	404	448	492	536	580	624	672	720	768	816	864	912	960	1008	1056	1104	1152
13	100	144	192	240	288	336	384	432	480	528	576	624	676	728	780	832	884	936	988	1040	1092	1144	1196	1248
14	100	148	200	252	304	356	408	460	512	564	616	672	728	784	840	896	952	1008	1064	1120	1176	1232	1288	1344
15	100	152	208	264	320	376	432	488	544	600	660	720	780	840	900	960	1020	1080	1140	1200	1260	1320	1380	1440
16	100	156	216	276	336	396	456	516	576	640	704	768	832	896	960	1024	1088	1152	1216	1280	1344	1408	1472	1536
17	100	160	224	288	352	416	480	544	612	680	748	816	884	952	1020	1088	1156	1224	1292	1360	1428	1496	1564	1632
18	100	164	232	300	368	436	504	576	648	720	792	864	936	1008	1080	1152	1224	1296	1368	1440	1512	1584	1656	1728
19	100	168	240	312	384	456	532	608	684	760	836	912	988	1064	1140	1216	1292	1368	1444	1520	1596	1672	1748	1824
20	100	172	248	324	400	480	560	640	720	800	880	960	1040	1120	1200	1280	1360	1440	1520	1600	1680	1760	1840	1920
21	100	176	256	336	420	504	588	672	756	840	924	1008	1092	1176	1260	1344	1428	1512	1596	1680	1764	1848	1932	2016
22	100	180	264	352	440	528	616	704	792	880	968	1056	1144	1232	1320	1408	1496	1584	1672	1760	1848	1936	2024	2112
23	100	184	276	368	460	552	644	736	828	920	1012	1104	1196	1288	1380	1472	1564	1656	1748	1840	1932	2024	2116	2208
24	100	192	288	384	480	576	672	768	864	960	1056	1152	1248	1344	1440	1536	1632	1728	1824	1920	2016	2112	2208	2304
25	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Over 25 (per pound)	4c	8c	12c	16c	20c	24c	28c	32c	36c	40c	44c	48c	52c	56c	60c	64c	68c	72c	76c	80c	84c	88c	92c	96c

* From C.A.A. *Air Express Tariff* No. 1.

** First zone 149 miles, each subsequent zone 100 miles, except zone 24 which includes all distances beyond 2,349 miles.

APPENDIX II

Air Express Pound-Mile Rates (In Cents)

Distance Zones**

LBS.*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	1.000	.500	.333	.250	.200	.167	.143	.125	.111	.100	.091	.083	.077	.071	.066	.062	.059	.055	.053	.050	.048	.045	.043	.042	.040	.038	.037	.035	.034	.033
2	.500	.250	.149	.122	.112	.097	.086	.077	.071	.066	.062	.058	.055	.053	.051	.049	.047	.046	.044	.043	.042	.041	.040	.040	.038	.037	.036	.034	.033	.032
3	.333	.173	.124	.093	.080	.076	.069	.063	.059	.056	.053	.051	.049	.048	.046	.045	.044	.043	.042	.041	.041	.040	.040	.040	.038	.037	.036	.034	.033	.032
4	.250	.135	.100	.082	.072	.065	.060	.056	.053	.051	.050	.047	.046	.045	.044	.043	.042	.042	.041	.041	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
5	.200	.112	.085	.072	.064	.059	.055	.052	.050	.048	.047	.045	.044	.043	.043	.042	.041	.041	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
6	.167	.097	.076	.065	.059	.054	.051	.049	.048	.046	.045	.044	.043	.042	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
7	.143	.085	.069	.060	.055	.051	.050	.047	.046	.045	.044	.043	.042	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
8	.125	.077	.063	.056	.052	.049	.047	.046	.044	.043	.043	.042	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
9	.111	.071	.059	.053	.050	.047	.046	.044	.043	.043	.042	.041	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
10	.100	.066	.056	.051	.048	.046	.045	.043	.043	.042	.041	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
11	.091	.062	.053	.049	.047	.045	.044	.043	.042	.041	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
12	.083	.058	.051	.047	.045	.044	.043	.042	.041	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
13	.077	.055	.049	.046	.044	.043	.042	.041	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
14	.071	.053	.048	.045	.043	.042	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
15	.066	.051	.046	.044	.042	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
16	.062	.049	.045	.043	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
17	.059	.047	.044	.042	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
18	.055	.046	.043	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
19	.053	.044	.042	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
20	.050	.043	.041	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
21	.048	.042	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
22	.045	.041	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
23	.043	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
24	.042	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032
25 and Over	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.038	.037	.036	.034	.033	.032

* Fractions of pounds omitted in the interest of clarity.
** First zone 149 miles, each subsequent zone 100 miles, except zone 30 which includes all distances beyond 2,949 miles.

APPENDIX III

Suggested Air Freight Tariff Provisions

Basic Rates

Weight	*Distance Zones* — *To* 1000 *miles*	1001-2000 *miles*	2001-3000 *miles*
Up to 10 lbs.	$1.50	$2.50	$3.50
Each lb. over 10 lbs.	.15	.25	.35

Fractions of a pound will be charged for as a full pound.

Space

Packages with cubic measurements exceeding 200 cubic inches per pound will be charged for on the basis of one pound for each 200 cubic inches.

Excess Value (Insurance)

The charges shown herein provide full Common Carrier liability for a valuation not exceeding $50 for packages weighing less than 100 pounds or 50 cents per pound, actual weight, for packages weighing over 100 pounds. When the declared value exceeds $50 for any shipment of 100 pounds or less, or exceeds 50 cents per pound actual weight for any shipment in excess of 100 pounds an additional charge of 10 cents will be assessed for each $100 or fraction thereof in excess of the value stated above and such additional charges provide full Common Carrier liability for the value so declared.

Special Classes

Cut flowers and fresh fruits and vegetables and other specified commodities will be charged for at 60 to 75 per cent of regular charges.

Deferred Delivery

Except commodities mentioned above in Special Classes, transcontinental shipments will be accepted for delivery in one or two days' extra time at 50 to 75 per cent of the basic rates.

APPENDIX IV

Suggested Air Freight Pound-Mile Rates
(In Cents)

Distance Zones*

LBS.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	1.500	.750	.500	.375	.300	.250	.214	.187	.166	.150	.228	.208	.192	.179	.167	.156	.147	.139	.132	.125	.166	.159	.152	.146	.140	.135	.130	.125	.121	.117
2	.750	.370	.250	.187	.150	.125	.107	.093	.083	.075	.114	.104	.096	.090	.083	.078	.073	.070	.066	.063	.083	.080	.076	.073	.070	.068	.065	.062	.060	.058
3	.500	.250	.166	.125	.100	.083	.071	.062	.055	.050	.076	.069	.064	.060	.056	.052	.049	.046	.044	.042	.055	.053	.051	.049	.047	.045	.043	.042	.040	.039
4	.375	.187	.125	.093	.075	.063	.053	.044	.042	.037	.057	.052	.048	.045	.042	.039	.037	.035	.033	.031	.042	.040	.038	.036	.035	.034	.032	.031	.030	.029
5	.300	.150	.100	.075	.060	.050	.043	.037	.033	.030	.046	.042	.038	.036	.033	.031	.029	.028	.026	.025	.033	.032	.030	.029	.028	.027	.026	.025	.024	.023
6	.250	.125	.083	.063	.050	.042	.036	.031	.028	.025	.038	.035	.032	.030	.028	.026	.024	.023	.022	.021	.028	.026	.025	.024	.023	.023	.022	.021	.020	.019
7	.214	.107	.071	.053	.043	.036	.031	.027	.024	.021	.033	.030	.028	.026	.024	.022	.021	.021	.019	.018	.024	.023	.022	.021	.020	.019	.019	.018	.017	.017
8	.187	.093	.062	.047	.037	.031	.027	.023	.021	.019	.028	.026	.024	.022	.021	.020	.019	.017	.016	.016	.021	.020	.019	.018	.018	.017	.016	.016	.015	.015
9	.166	.083	.055	.042	.033	.028	.024	.021	.018	.016	.025	.023	.021	.020	.019	.017	.016	.016	.015	.014	.019	.018	.017	.016	.016	.015	.014	.014	.013	.013
10 and Over	.150	.075	.050	.037	.030	.025	.021	.018	.016	.015	.023	.021	.019	.018	.017	.016	.015	.014	.013	.013	.017	.016	.015	.015	.014	.013	.013	.013	.012	.012

* First zone 149 miles, each subsequent zone 100 miles, except zone 30 which includes all distances beyond 2,949 miles.

APPENDIX V

Suggested Air Freight

Coast-to-Coast Time Schedule for Primary Route No. 2

Miles	*Station*	*Local Time*	*Time Zone*	*Local Time*
	NEWARK	lv. 22:00	EST	arr. 07:41
72				
	CAMDEN	arr. 22:50	EST	arr. 06:47
101				
	HARRISBURG	arr. 00:07	EST	arr. 05:39
132				
	PITTSBURGH	arr. 01:43	EST	arr. 04:16
127				
	CLEVELAND	arr. 03:16	EST	arr. 02:53
91				
	DETROIT	arr. 04:28	EST	arr. 01:50
63				
	TOLEDO	arr. 05:23	EST	arr. 01:01
150				
	SOUTH BEND	arr. 06:09	CST	arr. 22:29
79				
	CHICAGO	arr. 07:13	CST	arr. 21:32
200				
	IOWA CITY	arr. 09:29	CST	arr. 19:35
109				
	DES MOINES	arr. 10:51	CST	arr. 18:23
117				
	OMAHA	arr. 12:18	CST	arr. 17:07
53				
	LINCOLN	arr. 13:07	CST	arr. 16:23
178				
	NORTH PLATTE	arr. 15:10	CST	arr. 14:37
238				
	CHEYENNE	arr. 16:48	MST	arr. 11:21
230				
	ROCK SPRINGS	arr. 19:21	MST	arr. 09:09
160				
	SALT LAKE CITY	arr. 21:14	MST	arr. 07:32
220				
	ELKO	arr. 22:41	PST	arr. 04:25
210				
	RENO	arr. 01:02	PST	arr. 02:23
200				
	SAN FRANCISCO	arr. 03:18	PST	arr. 00:26
166				
	FRESNO	arr. 05:14	PST	arr. 22:46
198				
	LOS ANGELES	arr. 07:27	PST	lv. 21:00
3,094	Total	Read Down		Read Up

24 hour clock used.
10 minutes allowed at each stop; 8 minutes for maneuvering between stops.
Average ground speed 102 m.p.h. westbound; 121.3 m.p.h. eastbound.

EDITORIALS

GOODS BY AIR

The policy of air transport development in the United States, both private and governmental, has been that of having air mail pay to carriers not exceed air mail revenues. Although there is yet some controversy on the subject, the domestic carriers have attained this goal substantially and as a result extension of air mail service, including feeder service, is in the offing. This result has been accomplished in large degree by the magnificent increase in passenger business produced by the air carriers. While the saturation point in passenger traffic has not been reached, it is to be noted that the revenue passenger load factor for the first six months of 1939 was 53.84 per cent, an increase of 13.83 per cent over the same period in 1938. Any good operations manager will tell you that when you have more than 60 per cent of your seats regularly occupied, you are confronted with the problem of added schedules and second sections if you are to take care of all of those increasing surges of unexpected and emergency traffic and not lose passengers to other forms of transportation. Therefore with Douglas DC-3 aircraft as standard equipment for air carriers for a year or two yet to come, there is a problem as to what revenues may be produced from sources other than passengers and mail.

The air transport industry has slowly increased its revenues for the carriage of goods from less than 1 per cent of total revenue to but approximately 3 per cent, and the goods carried have been so limited in size and weight as to be called "air express". In the first two years following the air mail cancellation air express pounds carried showed a greater percentage of increase each successive year than did passengers carried, but beginning with 1937 the annual percentage increases for express pounds carried have fallen behind, and this during a period when the Railway Express Agency, taking over the air express field, added a complete country-wide coverage with an excellent pick-up and delivery service. The contrast just pointed out either means that there is no great opportunity for the carriage of goods by air or that the field has been inadequately explored. To the end that the question may be examined there is published in this issue the painstaking and interesting article of William M. Sheehan on "Air Freight for the United

States." It is hoped that it will be the forerunner of other contributions in this field.

HURRY UP CAPA

We invite you to read most carefully the article in this issue by Samuel E. Gates, Chief, International Division, Civil Aeronautics Authority, on "International Control of Aviation in Time of Peace." From it you will see that the United States has already entered into nearly one hundred international treaties which affect the national air sovereignty of the United States, the registration and airworthiness of our aircraft, the competency of our airmen, the prohibition of the transport of certain kinds of articles, and the liability of the air carrier to passengers and shippers. To these should be added the pending proposals to establish rules for the determination of damages to persons and property on the ground and for collision, for mortgagees of aircraft, for salvage, for lessors and lessees, for attachment of aircraft, and in connection with aircraft personnel's contract of employment and the aircraft commander's authority. Practically all of these treaty commitments and proposals have been patterned after the so-called CINA, an international organization dealing with public air law and of which the United States is not a member, and the so-called CITEJA, an international organization dealing with private air law and with which the United States became officially identified in 1935. Both of these organizations had their origin in Europe and have their main offices there and are staffed by Europeans. It was inevitable that the underlying tenents of the treaties have had a distinct European flavor and background.

Now that World War II is on Mr. Gates' article and any discussion of the subject matter may at first blush seem moot, but just the contrary is true. The Europeans are so busy with the military, which has always been their prime air objective rather than commercial development, that they have ceased to press their civil international proposals, as evidenced by the postponement of the CITEJA meeting in Luxembourg and the New York meeting of the International Air Traffic Association (the first to be held on American soil), both scheduled for September of this year. On the other hand, at the Inter-American Technical Aviation Conference at Lima, Peru, in 1937 a resolution was adopted for the creation of the Permanent American Aeronautical Commission, commonly called CAPA from the first letters of its official name, Comision Aeronautica Permanente Americana. This is an organization designed

to cover both public and private air law for the two American continents. It will come into being when national commissions composed of aviation experts are organized in at least seven American republics irrespective of their participation at Lima. Within twelve months after that takes place the first session of CAPA will be held at Bogota, Colombia. So far as can now be ascertained the United States Commission has not been named. However, this could easily and quickly be done with the cooperation of the leading aeronautical groups of the United States, and, with Pan American unity as never before, the permanent inter-continental organization could be set up and functioning. Best of all this can be done with almost no European influence, which no one will now deny was most active in South America in every respect prior to World War II.

THE CAA CHOOSES A GENERAL COUNSEL

The Civil Aeronautics Authority has recently announced its appointment of L. W. Pogue as its General Counsel. The choice is a happy one and brings much satisfaction and comfort to everybody connected with aeronautics. For the past year Mr. Pogue as Assistant General Counsel has carried the burden of the office with patience, ability, and a most refreshing good humor in the face of the many obstacles that arose in connection with a new law, a new agency, and a national program of aviation expansion. Mr. Pogue not only has the necessary ability, but he is an unusual listener, a good learner, and with it all young enough to be thoroughly in sympathy with the new problems of aviation and to recognize that they are neither to be fettered by ancient precedents nor to be treated as freaks.

STATE

Department Editors ..... GILL ROBB WILSON, ELWOOD B. COLE

REPORT OF THE STANDING COMMITTEE ON AERONAUTICAL LAW

RECOMMENDATIONS

Your committee recommends the adoption of the following resolutions:

I

WHEREAS, The Congress of the United States has passed the Civil Aeronautics Act of 1938, and

WHEREAS, The Civil Aeronautics Authority which was created by such Act is now engaged in a study of the desirability of further Federal or State legislation to supplement such Act and has invited the cooperation of the Committee on Aeronautical Law of the American Bar Association,

Be It Resolved, That this Committee be authorized to cooperate with the Civil Aeronautics Authority in such study.

II

WHEREAS, The Association at the Cleveland convention in July, 1938, endorsed the sound principle that the salvage of aircraft lost at sea shall, in the absence of any agreement to the contrary, be regulated by the principles of maritime law, and directed this committee to draw an appropriate bill and cooperate with the Maritime Law Association to the extent found suitable, and

WHEREAS, The Fourth International Conference on Private Air Law at which the United States was represented at Brussels, Belgium, in September, 1938, adopted and signed a convention for the unification of certain rules relative to assistance and salvage of aircraft or by aircraft at sea, which convention now awaits ratification by the United States,

Be It Resolved, That this committee be instructed to hold the bill it has drafted pursuant to last year's resolution of this Association, suspend any activity that might be directed to the passage of legislation on this subject, and to report to the Association concerning final ratification by the United States, particularly advising whether the convention, if ratified, may not make the proposed legislation unnecessary.

III

WHEREAS, It appears that the existing United States Customs and Immigration Laws and Regulations made pursuant thereto, in many instances do not meet the changed conditions of air commerce,

Be It Resolved, That the Association instruct the Committee on Aeronautical Law to make a study of these Customs and Immigration Laws and Regulations to determine in what respect they should be amended, and thereupon to cooperate with the proper government departments and agencies to the end that such amendments be accomplished.

REPORT

PROGRESS TOWARD UNIFORMITY IN THE LAW OF AVIATION

It is probably inevitable that sharp differences of view will arise in a field of law covering a rapidly growing science like aviation. Reports of the Committee on Aeronautical Law from 1921 to the present date reveal this conflict.

In 1922 the American Bar Association passed a resolution approving a proposed Uniform Aeronautics Act to be passed by each state, section 3 of which reads as follows:

> SECTION 3. The ownership of the space above the lands and waters of this state is declared to be vested in the several owners of the surface beneath, subject to the right of flight prescribed in section 4.

But in 1936 the Hinman case (*Hinman, et al.* v. *Pacific Air Transport,* 84 Fed. (2d) 755, Cert. denied 57 Sup. Ct. 431) held:

> Title to the air space unconnected with the use of land is inconceivable. Such a right has never been asserted. It is a thing not known to the law.

For fifteen years there has been controversy over the right, if any, of flight—whether such right is positive or limited, or at what heights it becomes positive, instead of qualified; whether flying over a landowner's premises is a trespass, or, if unduly interfering, may be a nuisance; the extent to which the federal government may go in efforts to achieve safety and uniformity in the operation of aircraft, and whether the federal government has authority to enter the entire field of law and regulation of aviation through the commerce clause of the Constitution, or through its treaty-making powers. (See 1932 A.B.A. Rep., 372.)

There has, however, been one point on which *all* groups of the bar have *at all times* agreed, namely, that UNIFORMITY of law and regulations is desirable.

Disputes have arisen over the *way* uniformity may be accomplished.

Most of the reports of this committee have proceeded on the theory that there must be a state-by-state adoption of a Uniform Aeronautical Code.

While civic aviation was limited in scope, the problem looked reasonably easy for states to cover. But, while the lawyers were arguing, the industry outgrew state regulation.

Necessity for central control culminated first in the Air Commerce Act of 1926.

The industry and the public interest have not ceased to run ahead of the law.

So, the Bar Association has continued to labor over the question—

> Can the subject be covered by a state code or is federal legislation and regulation necessary in order to secure uniformity?

From 1926 to 1929, this committee has worked diligently. The practical difficulty in drafting an acceptable law is well stated in the 1929 report—

> For several years your committee has been endeavoring to procure uniformity in state legislation. . . . We have found that there is a very real conflict of opinion as to the fundamental theory on which uniform state legislation should be based.

In 1930 when the committee again took over the burden of trying to work out a Uniform State Code, it again pointed out the difficulties, and the slowness of achieving results by such a method. However, the committee reported that a tentative draft of a Uniform State Code had been prepared, but observed:

> As the study of this proposed code has gone forward, new and varying problems have arisen as a result of judicial decisions and administrative interpretation of existing state laws. . . . Though substantial progress has been made . . . there is much to be gained by awaiting a clearer interpretation of perplexing fundamental problems. . . .

In 1931 the committee submitted a draft, but pointed out the intentional omission of section 3 of the early 1922 Aeronautics Act, and because of the conflict of opinion over ownership of air space, did not request approval of its draft.

In 1932 the committee expressed doubt whether uniformity could ever be accomplished by means of developing a uniform law for the states, and voiced the idea that perhaps the federal government could resolve the uncertainty by usurping the field through its treaty-making powers, citing *Mis-*

souri v. *Holland*, 252 U. S. 416. That the United States was one of the signatories to the Pan-American Convention on Commercial Aviation—article XXXII of which provides:

> The contracting parties shall procure as far as possible uniformity of laws and regulations governing aerial navigation—

was noted, and the suggestion advanced that in order to put such a treaty obligation into full force and effect, the United States might regulate both intra- and interstate air traffic.

But the federal government continued to occupy only a part of the regulatory field.

From 1933 to date this committee has worked diligently in cooperation with the National Conference of Commissioners on Uniform State Laws to prepare a uniform state aeronautical code.

This work has involved serious questions both of policy and of law.

The code has not been submitted to this Association, and the N.C.C.U.S.L. is not prepared as yet to submit it.

In the meantime, the Congress passed the Civil Aeronautics Act of 1938 creating the Civil Aeronautics Authority.

The Authority is now considering the question whether the entire field of regulation cannot and should not be covered by federal law. It has invited the cooperation of this committee and of the Committee on Uniform State Aeronautical Code of the N.C.C.U.S.L.

We believe that this Association should cooperate in this study, and that all further work on the preparation of state regulation should be postponed until the Civil Aeronautics Authority has completed its study.

Consequently, the committee recommends the adoption of the above Resolution No. 1.

The Civil Aeronautics Act of 1938[1]

Prior to June 23, 1938, federal control of civil aeronautics was divided between three governmental agencies: (1) *The Department of Commerce* charged with (a) providing, operating and maintaining federal airways aids; (b) collecting and disseminating aeronautical information; (c) inspecting aircraft, airmen, and airlines; (d) enforcing federal regulations; and (e) federal promotion of aeronautics; (2) *The Post-Office Department* which awarded contracts for the carriage of air mail, made payments therefor, and enforced certain provisions of the air mail laws; and (3) *The Interstate Commerce Commission* to which was entrusted the responsibility for fixing rates of pay to be made to air mail contractors.

In January, 1938, it was suggested that all federal functions in the field of aeronautics be collected under a single agency.[2]

The Civil Aeronautics Authority was the final answer of Congress. It is a board of five members created by the Civil Aeronautics Act of 1938 (48 USCA, Sec. 401 *et seq.*), which became a law on June 23, 1938. The law is similar to the Federal Power Act, the Securities Exchange Act, the Interstate Commerce Act, and other governmental regulatory acts.

Appointments of the Authority members, and of the Administrator (an independent executive whose office was also created by the act) were not confirmed until February 17, 1939. The Authority consists of Robert H. Hinckley, chairman; G. Grant Mason, Jr.; Harllee Branch, Oswald Ryan, and Edward P. Warner.

Clinton M. Hester is the Administrator.

The Authority is, like other boards, an agency of Congress with quasi-legislative and quasi-judicial functions. Its decisions are reviewable by courts, but are not subject to presidential supervision or control. It exercises regulatory powers exclusively—economic regulation, and safety regulation.

The economic regulatory power embraces not only the common carriers of the air which operate within the United States and its territorial pos-

1. For a detailed explanation of the act, see statement of the Managers on the Part of the House, in Report No. 2635, of House Report, 75th Congress, 3rd Session, p. 64.
2. See Committee Report, 1938 A.B.A. Rep. 214.

sessions, but also American air carriers engaged in overseas and foreign air transportation and foreign air carriers operating between foreign countries and the United States or its possessions.

Being mindful of previous criticism by the bar of regulatory commissions, the Authority of its own accord, has created from its own personnel, an Economic Compliance Division, which at all hearings acts in the rôle of prosecutor, representing the general public. The object of this is to help the Authority to preserve its judicial attitude and position.

The safety regulatory power of the Authority extends over all civil aircraft, all airmen and ground personnel, as well as over the manufacture, design, and export of aircraft and certification of schools for the training of pilots and mechanics.

The act also establishes within the Authority an Air Safety Board of three members appointed by the President with the advice and consent of the Senate. They are Major Sumpter Smith, chairman; C. B. Allen and Thomas Hardin. This board is an independent investigatory and analytical body, charged with inquiring into all accidents involving aircraft and with the duty of making recommendations to the Authority for the prevention of similar accidents in the future.

Inasmuch as investigation of accidents by this board could involve a criticism of the activities of either the Authority or the Administrator, it is the intent of the act to make this board as completely independent of the Authority and the Administrator as is possible.

The Office of the Administrator

A real problem for Congress in combining such a variety of functions in one unit, was to find a means whereby the President could retain control, in so far as strictly executive functions were concerned, such as over the purchase and improvement of federal property, without control of the judicial powers of the Authority.

Creation of the office of the Administrator, with duties independent of the Authority, was the answer of Congress.

This Administrator is appointed by the President and holds office subject to his will. His primary responsibility is executive, namely, the construction, operation and maintenance of air navigation aids, and the promotion of federal experimentation in the field of aeronautics. His independent duties are clearly outlined in the act, and over his performance of them the members of the Authority exercise no supervision whatsoever. Nor is there any appeal from his decision, to the Authority, or to the courts.

However, the act provides also that the Administrator *may* exercise secondary functions delegated to him by the Authority. The provision has not been generally understood.[3]

Responsibilities which the Authority may delegate to the Administrator are of a purely routine administrative character. The Authority is precluded from transferring any of its quasi-judicial or quasi-legislative functions. And it is a matter within the Authority's sole discretion whether it assigns any duties whatsoever to the Administrator.

The Authority has so far found the power of delegation of certain duties a wise provision of the law. It is a means of greater coordination, and an opportunity to harmonize action between the Authority and the office of the Administrator.

Revision of Regulations

The Authority inherited the old Bureau of Air Commerce Regulations, but is now engaged in the work of adapting these to the provisions of the new act, and the committee is pleased to report it is devoting principal attention to their simplification and modernization.

Although proceeding slowly in this task of revision of rules, the Authority is apparently evincing no timidity in covering, so far as may be nec-

3. See Article by Clinton M. Hester, Administrator, entitled "The Civil Aeronautical Act of 1938," 9 Journal of Air Law 451, 1938. Also see lecture delivered by Oswald Ryan, Member of the Authority, at the Harvard Law School, on January 20, 1938, entitled "Administrative Law and Procedure," a copy of which may be obtained by writing to the Authority.

essary to control air commerce, the entire field. The underlying thought is that they may do this under the act. Wide power of intrastate control can, of necessity, be developed, because there is no intrastate flying to speak of today that does not in some manner, use or rely upon the air navigation facilities owned in most instances or controlled by the federal government.

The law furnishes a clearer declaration on the much controverted right of flight for any citizen, as follows:

> There is hereby recognized and declared to exist in behalf of any citizen of the United States a public right of freedom of transit in air commerce through the navigable air space of the United States.

The definition of "air commerce" contained in section 1 of the act includes "any operation or navigation of aircraft within the limits of any civil airway, or any operation or navigation of aircraft which directly affects, or which may endanger safety in interstate, overseas or foreign air commerce."

A civil airway is defined in the act as "a path through the navigable air space of the United States identified by an area on the surface of the earth, designated or approved by the Administrator as suitable for interstate, overseas or foreign commerce." These airways have been so extended in recent years that they crisscross every state, and regulations establish an "airway" as a twenty-mile strip along their course. Indeed it is difficult to conceive, even in the large state of Texas, how anyone could conduct an aviation school, or other kind of intrastate aviation enterprise where he would not in his operations make use of an airway or other federal air navigation facilities. And, in so far as he should make any use of them, the law provides that he would thereby subject himself to the federal authority. With such a background of law, regulations upon which the Authority is now working may be expected to cover every phase of aviation.

The Civil Aeronautics Authority must also administer the act consistently "with any obligation assumed by the United States in any treaty convention or agreement that may be in force between the United States and any foreign country." One such treaty is the Pan-American Convention ratified by the United States on August 26, 1931. It has, pursuant to the Constitution of the United States (art. VII, sec. 2) become part of the supreme law of the land. Under article XXXII of it, the contracting governments agree to "procure as far as possible uniformity of law and regulations governing aerial navigation."

It would seem, therefore, that proponents of this new act are prepared to defend its broad scope and its apparently almost unlimited regulation-making powers, under *all* theories, the commerce clause of the Constitution (particularly because of its safety promotion features), and also under the government's treaty powers as well.

New Division of International Communications in State Department

To assist the Civil Aeronautics Authority, and also to render assistance to shipping, moving picture, aviation and telegraphic industries, the State Department has recently created a Division of International Communications. Mr. Thomas Burke is the chief of the division. Mr. Stephen Latchford is chief of its aviation section. This division of the State Department and the Civil Aeronautics Authority have cooperated closely in policies and activities. Formerly in the State Department if a question came up involving aviation in China, it would be handled by the Division of Far Eastern Affairs. If an identical question arose in Peru, it would be handled by the Division of the American Republics. Now, however, instead of the scattered and contradictory attention resulting from assignment solely according to geography, questions involving aviation are converged in the one unit. Thus attention can be given by a specialist versed in aviation problems in various parts of the world, and in the treaty provisions affecting the solution of these problems.

International Aeronautical Law

Salvage of Aircraft Under Maritime Law

This committee was faced with a dilemma from the fact that two months after the Association's 1938 meeting in Cleveland which instructed

the committee to draft a bill making the principles of maritime law with reference to the salvaging of ships applicable to aircraft, the United States participated in an international conference at Brussels, Belgium, which adopted a convention on the same subject.

In this committee's report for 1935 attention was called to the fact that the United States had failed to send representatives to international meetings, because it had no appropriation to cover the expenses of delegates.

In 1938, by reason of the passage of a bill providing for such funds, the United States was able to send a full delegation, which took an active part in the deliberations. These United States representatives report that they met with success in getting most of their major proposals adopted by the conference. The International Agreement governing salvaging of property and persons at sea overlaps the subject-matter of the bill which the Association asked this committee to draft. Although the committee has prepared an "appropriate" bill, as instructed to do, it has not considered the time "suitable" in view of changed conditions, to cooperate with the Maritime Law Association or to take any other steps toward the passage of the bill, because the committee feels that the final ratification of the convention by the United States may make the proposed legislation unnecessary.

Accordingly, therefore, to clarify the committee's work for next year, the above resolution No. 11 is proposed.

Brussels Conference

The Fourth International Conference on Private Air Law convened at Brussels on September 19, 1938. For an illuminative report on this conference see article by Stephen Latchford, *Journal of Air Law*, Vol. 10, No. 2, April, 1939. The United States was represented by G. Grant Mason, Jr., member of the Civil Aeronautics Authority, Chairman; Stephen Latchford, Department of State, Vice-Chairman; and Denis Mulligan, Consulting Counsel on International Aviation, Civil Aeronautics Authority. Technical advisers accompanying the delegation were Laurel E. Anderson, Legal Adviser of the Maritime Commission at London; Captain L. T. Chalker, Chief Aviation Officer, United States Coast Guard; Arnold W. Knauth, member of this committee in 1938, and J. Brooks B. Parker, Aviation Insurer.

This conference adopted an international convention relating to assistance and salvage of aircraft or by aircraft at sea, embracing the following principles:

(1) That the commanding officer of an aircraft shall be bound to render assistance to any person who is at sea in danger of being lost, in so far as such assistance may be rendered without serious danger to the aircraft, her crew, her passengers, or other persons.

(2) Every captain of a vessel shall be bound, under the circumstances contemplated in paragraph (1), and without prejudice to more extended obligations imposed upon him by the laws and conventions in force, to render assistance to any person who is at sea in danger of being lost on an aircraft or as the consequence of damage to an aircraft.

(3) Any assistance so rendered in discharge of the obligation contemplated above shall call for an indemnity based on the expenses justified by circumstances, as well as the damage suffered in the course of the operations, such indemnity to be payable by the operator of the aircraft assisted, or by the owner or *armateur* of the vessel assisted in accordance with the rules of the national laws or of the contracts governing such vessel. The indemnity cannot exceed the sum of 50,000 gold francs per person saved, and if no persons have been saved, the total sum of 50,000 gold francs. In any case the obligation of the aircraft operator shall be limited to 500,000 gold francs. The owner or *armateur* of the vessel shall not be liable beyond the limits determined by the existing laws and conventions governing his obligation in matters of maritime assistance and salvage.

(4) In case of assistance and salvage of the aircraft at sea, the remuneration shall be determined upon the following basis:

(a) The measure of success obtained, the efforts and desserts of those who have rendered assistance, the danger run by the aircraft assisted, her passengers, her crew and her cargo, by the salvors and by the salving aircraft or vessel, the time consumed, the expenses incurred, and the losses suffered, and the risks of liability and other risks run by the salvors, the value of the property risked by them.

(b) The value of the things salved.

(5) No remuneration is due if the services rendered have no useful result, and the remuneration can never exceed the value of the property salved at the conclusion of the operations of assistance or salvage.

(6) The same rules shall apply in case of assistance or salvage at sea by an aircraft of a vessel, in which case the owner or *armateur* of the vessel shall retain the right to avail himself of the limitation of his liability as determined by existing laws and conventions governing maritime salvage and assistance.

(7) The operator of the aircraft shall have recourse against the owners of goods for such part of the remuneration as pertains to the assistance and salvage of such goods.

(8) Indemnity and remuneration actions must be brought within two years from the end of the operations of assistance or salvage, and recourse of operators against the owners of goods shall be barred after a period of one year beginning with the date of the payment of the remuneration for assistance or salvage.

(9) As soon as five ratifications shall have been deposited with the Government of the Kingdom of Belgium, the convention shall come into force between the High Contracting Parties which shall have ratified in ninety days after the deposit of the fifth ratification. Any ratification deposited subsequently shall take effect ninety days after such deposit.

(10) The convention, after coming into force, shall be open for adherence by other countries, effective ninety days after notification to the Government of the Kingdom of Belgium.

A complete copy of the convention, including the report of the proceedings, may be obtained by any interested member of the bar from the State Department, Washington, D. C.

The convention also adopted a protocol supplementing the convention for the Unification of Certain Rules Relating to Damages Caused by Aircraft to Third Parties on the Surface, concluded at Rome, May 29, 1933.

Inasmuch as the Rome Convention has not been either ratified or adhered to by the United States, it is not deemed necessary to give any detailed explanation of this protocol.

The C.I.T.E.J.A.

January 23 and 24, 1939, Commissions of the C.I.T.E.J.A. met in Paris to consider matters referred to it by the Brussels Conference of September 28, 1938. The United States was represented by Arnold W. Knauth, member of this committee in 1938, and Denis Mulligan of the Civil Aeronautics Authority. These delegates recommended that the C.I.T.E.J.A. seeks more direct participation in its work from various groups concerned with civil air navigation; that the study of insurance be left to the International Association of Aviation Underwriters and International Air Traffic Association; that the question of salvage on land be worked out with those engaged in the practical operation of aircraft in remote desert or wilderness regions, and that foreign judgments should be studied through the International Association.

The next session of the C.I.T.E.J.A. will be in September, 1939. This committee calls the Association's attention to an interesting and comprehensive report by Mr. Knauth concerning the work being done by C.I.T.E.J.A. It is published in the *Journal of Air Law and Commerce*, Vol. 10, No. 2, April, 1939.

Modernization of the Customs and Immigration Laws

The fundamental immigration and customs laws were enacted many years ago. Most of them were drafted when there was no air commerce at all and made to fit the case of a vessel either tied up at dock or lying in the harbor. For instance, the immigrant whose right to enter was doubted is obliged to remain aboard the vessel until his status is determined. Obviously this procedure is impossible in air commerce since the vessel immediately after discharge of passengers and cargo must be taken ashore for housing, inspection, and if necessary, overhauling.

Section 7 of the Air Commerce Act of 1926 makes immigration and customs laws and regulations relating to the administration of each apply to air navigation. Often difficult and amusing situations occur because their language and procedure are obsolete in the field of air commerce. Some effort has been made by government departments to modernize the regulations, and it is therefore suggested that this committee be authorized to study customs and immigration laws and regulations to determine in what respects they should be amended, and cooperate with the proper government departments and agencies to the end that these revisions be made appropriate to the conditions of air transportation.

Accordingly, resolution No. III above set forth, is advanced for this purpose.

MABEL WALKER WILLEBRANDT, *Chairman,*
FRED D. FAGG, JR.*
WILLIAM A. SCHNADER,
FRANCIS B. UPHAM, JR.,
J. E. YONGE.

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* This report was approved as herewith presented by all members of the committee present at its final meeting. Mr. Fagg, who was unable to be present at this meeting, has communicated his dissent to that part of the statement, supporting Resolution I which appears on p. 507, reading, "We believe that this Association should cooperate in this study and that all further work on the preparation of state regulation should be postponed until the Civil Aeronautics Authority has completed its study"; and also to the statement (p. 509), "With such a background of law, regulations upon which the authority is now working may be expected to cover every phase of aviation."

MABEL WALKER WILLEBRANDT,
Chairman.

INTERNATIONAL

Department Editors ..... {STEPHEN LATCHFORD / SAMUEL E. GATES}

"ARRANGEMENT BETWEEN THE UNITED STATES OF AMERICA AND CANADA RELATING TO AIR TRANSPORT SERVICES

ARTICLE 1

"Having in mind the desirability of mutually stimulating and promoting the sound economic development of air transportation between the United States and Canada, the Parties to this Arrangement agree that the establishment and development of air transport services between their respective territories by air carrier enterprises holding proper authorizations from their respective governments, shall be governed by the following provisions:

ARTICLE 2

"The present Arrangement shall apply to continental United States of America, including Alaska, and to Canada, including their territorial waters.

"The privileges accorded by this Arrangement shall be available only to air carrier enterprises *bona fide* owned and controlled by nationals of the respective Parties.

ARTICLE 3

"Each of the Parties agrees, subject to compliance with its laws and regulations, to grant to air carrier enterprises of the other Party permits for non-stop services through the air space over its territory between two points within the territory of the other Party; provided, however, that inland non-stop services between the United States and Alaska shall be the subject of a separate understanding.

"Each party further agrees, subject to compliance with its laws and regulations, and on a basis of reciprocity to grant operating rights to the air carrier enterprises of the other Party for the operation of international services between a place in the territory of one Party and a place in the territory of the other Party.

"The details of the application of the principle of reciprocity contained herein shall be the subject of amicable adjustment between the competent aeronautical authorities of the parties to this arrangement.

ARTICLE 4

"Any air carrier enterprise of either Party applying for permission to operate in territory of the other Party shall be required to transmit its application through diplomatic channels in accordance with Article 3 (c) of the air navigation arrangement effected by an exchange of notes between the two Parties, signed on July 28, 1938.

"The air carrier enterprises of each Party will be required to qualify before the competent aeronautical authorities of the other Party under the latter's applicable laws and regulations before being permitted to engage in the operations contemplated by this Arrangement, and upon so qualifying will be issued permits or licenses by such authorities accordingly.

ARTICLE 5

"The terms of the permits referred to in Article 4, the airports to be used by the respective services, the routes or airways to be flown within the respective territories of the Parties between the designated airports, and other appropriate details of the conduct of the air transport services contemplated by this Arrangement shall be determined by the competent aeronautical authorities of the Parties. Any permit issued by the competent aeronautical

authorities for the air transport services contemplated hereunder shall be valid only so long as the holder thereof shall be authorized by its own Government to engage in the service envisaged by such permit. The holding of such permit shall be subject to compliance by the holder with all applicable laws of the issuing Government and with all valid rules, regulations and orders issued thereunder. Such permit may not be revoked for any cause other than non-compliance with such laws, rules, regulations or orders or for such reasons as the public interest may require.

ARTICLE 6

"Each of the Parties hereto agrees not to impose, and to use its best efforts to prevent the imposition of, any restrictions or limitations as to airports, airways or connections with other transportation services, and facilities in general to be utilized within its territory which might be competitively or otherwise disadvantageous to the air carrier enterprises of the other Party.

ARTICLE 7

"The aircraft operated by United States air carrier enterprises shall conform at all times with the airworthiness requirements prescribed by the competent aeronautical authorities of the United States for aircraft employed in air transportation of the character contemplated by this Arrangement.

"The aircraft operated by Canadian air carrier enterprises shall conform at all times with the airworthiness requirements prescribed by the competent aeronautical authorities of Canada for aircraft employed in air transportation of the character contemplated by this Arrangement.

"The competent aeronautical authorities of the Parties hereto may communicate with a view to bringing about uniformity of safety standards for the operations contemplated by this Arrangement and compliance therewith, and whenever the need therefor appears, the Parties may enter into an agreement prescribing such uniform safety standards.

ARTICLE 8

"The matter of the transportation of mail shall be subject to agreement between the competent authorities of both Parties.

ARTICLE 9

"The operations contemplated hereunder shall be conducted subject to the applicable terms of the air navigation arrangement effected by an exchange of notes between the two Parties signed on July 28, 1938.

ARTICLE 10

"This arrangement shall remain in force for a period of two years and thereafter until terminated on six months notice given by either Government to the other Government."

* * * * * *

As a result of the United States-Canada Civil Aviation Conference which was held at Ottawa from August 9, 1939 to August 11, 1939, the foregoing arrangement which will become effective on August 18, 1939, was entered into between the Governments of the United States and Canada. The arrangement was brought into effect by notes exchanged on August 18, 1939, between the Department of External Affairs at Canada and the American Legation at Ottawa.

It will be recalled in this connection that in January, 1938, an aviation meeting with Canadian officials was held in Washington. As a result of that meeting, three aeronautical arrangements were concluded with the Canadian Government. These related to (1) air navigation in general; (2) issuance by each country of pilot licenses to nationals of the other country for the operation of civil aircraft; and (3) reciprocal acceptance of certificates of airworthiness for exported aircraft.

The right to conduct scheduled air transport services between the two countries was not included within the terms of the general air navigation arrangement, and the purpose of the meeting in Ottawa was to enter into discussions of pending questions pertaining to the operation of such services.

The United States was represented at Ottawa by the following delegation, of which the Honorable Daniel C. Roper, United States Minister to Canada, was chairman:

From the Department of State:

THOMAS BURKE, Chief, Division of International Communications;
STEPHEN LATCHFORD, Chief, Aviation Section, Division of International Communications;
SYDNEY B. SMITH, Aviation Section, Division of International Communications.

From the Civil Aeronautics Authority:

HARLLEE BRANCH, Vice Chairman, Civil Aeronautics Authority;
G. GRANT MASON, JR., Member, Civil Aeronautics Authority;
EDWARD P. WARNER, Member, Civil Aeronautics Authority;
SAMUEL E. GATES, Chief, International Division, Civil Aeronautics Authority.

From the Post Office Department:

W. W. HOWES, First Assistant Postmaster General;
CHARLES P. GRADDICK, Superintendent of Air Mail.

The Canadian Delegation consisted of:

The Honorable C. D. HOWE, Minister of Transport, Chairman.

From the Department of Transport:

COLONEL V. I. SMART, Deputy Minister of Transport.
LIEUT.-CMDR. C. P. EDWARDS, Chief of Air Services.
MR. J. A. WILSON, Controller of Civil Aviation.
GROUP CAPTAIN A. T. COWLEY, Superintendent, Air Regulations.

From the Post Office Department:

MR. P. T. COOLICAN, Assistant Deputy Postmaster General.

From the Department of External Affairs:

MR. LORING C. CHRISTIE, Counsellor.

Also in attendance:

From the Post Office Department:

MR. GEORGE HERRING, Chief Supt., Air and Land Mail Services.

From the Department of Transport:

MR. J. R. K. MAIN.

NEW MEMBERS FOR CITEJA

The President has approved the appointment of the following named persons as additional members of the American Section of the International Technical Committee of Aerial Legal Experts commonly referred to as the CITEJA:

MR. SAMUEL E. GATES, Chief of the International Division, Civil Aeronautics Authority, Washington, D. C.;

MR. ARNOLD W. KNAUTH, Specialist in Air Law, New York, New York;

DR. ARTHUR L. LEBEL, Aviation Section, Division of International Communications, Department of State;

MR. EDWARD C. SWEENEY, International Division, Civil Aeronautics Authority, Washington, D. C.

The United States participates in the work of the International Technical Committee of Aerial Legal Experts as the result of the enactment by Congress of Public Resolution 118 approved February 14, 1931. The Committee is engaged in the codification of international private air law by the drafting of international conventions on which final action is taken at diplomatic conferences. Owing to the increasing scope of the work of the Committee it has been deemed advisable to enlarge the American membership so as to afford an opportunity for a thorough study of pending projects and in order to provide a larger panel of experts from among whom selections may conveniently be made to attend the sessions of the Committee.

The American Section of the International Technical Committee of Aerial Legal Experts is now constituted as follows:

MR. STEPHEN LATCHFORD, Chief of the Aviation Section, Division of International Communications, Department of State, Chairman of the American Section;

DR. FRED D. FAGG, JR. (formerly Director of Air Commerce), Vice President, Northwestern University, Chicago, Illinois;

MR. SAMUEL E. GATES, Chief of the International Division, Civil Aeronautics Authority, Washington, D. C.;

MR. ARNOLD W. KNAUTH, Specialist in Air Law, New York, New York;

DR. ARTHUR L. LEBEL, Aviation Section, Division of International Communications, Department of State;

DR. DENIS MULLIGAN (formerly Director of Air Commerce), Specialist in Air Law, New York, New York;

MR. EDWARD C. SWEENEY, International Division, Civil Aeronautics Authority, Washington, D. C.

NOTES, COMMENTS, DIGESTS

COMMENT

Municipal Airport—Establishment of Airport Jointly by Two Cities.— [Arkansas] Taxpayer's suit to enjoin the city of Helena, Arkansas, from issuing $16,000 in bonds toward the establishment of an airport jointly with the city of West Helena—the latter city to participate to the extent of $4,500. A demurrer to the complaint was sustained and the suit dismissed. From this action the taxpayer took an appeal contending (1) that the constitution does not authorize Helena to establish an airport jointly with a neighboring city; (2) that a municipality cannot hold property jointly.

The applicable constitutional provision (Amendment No. 13) authorized cities of the first and second class to issue bonds, after referendum, "for the purchase, development and improvement of public parks and flying fields located either within or without the corporate limits of such municipality." In 1939, the legislature expressly granted authority to any two or more municipalities "to own and hold in joint tenancy . . . lands for use as airports or flying fields which may be located either within or without their corporate limits; . . ."[1] *Held:* The constitution was not violated by providing for the development of an airport by two municipalities and, further, nothing in the constitution prohibits two cities from owning property as "tenants in common."[2]

The result reached is beyond dispute; however, it may be noted that the court failed to answer appellant's contentions directly. He contended cities could not hold property jointly, viz., in joint tenancy. The controlling statute only grants authority to hold airport property in "joint tenancy," yet the court disposed of the contention by deciding that nothing in the constitution prohibits two cities from holding property as "tenants in common."

The problem of the joint ownership and management of municipal property has rarely been considered by the courts. There is authority for the position that municipalities cannot hold property in joint tenancy.[3] These authorities are apparently not based upon constitutional infirmities, but upon the legal impracticability of a municipal corporation being a joint tenant. Joint tenancy is distinguished by the presence of the four unities (interest, title, time and possession), and the element of survivorship. A municipal corporation cannot fit the requirements of these four unities, and, due to its perpetual life, eliminates survivorship. Municipalities may validly hold property as tenants in common.[4] It is quite possible that the court abbreviated its opinion but, in effect, decided that a joint tenancy was impossible and under the prevailing rule a tenancy in common should be evolved.

The joint establishment of an airport by two cities involves (a) financial contributions and participation in a joint enterprise, and (b) municipal activities outside the corporate limits (at least for one of the municipalities).

1. *Ark.* Acts 1939, Act 80, p. 168. Similar statutory provisions are: *Mich. Stats. Ann.* (1937), Ch. 76, Sec. 10.66; *Ill. Bar Stats.* (1937), Ch. 24, Sec. 642]; *Wis. Stats.* (1935) Sec. 114.151.
2. *Ragsdale* v. *Hargraves, Mayor*, Arkansas Supreme Court, decided June 19, 1939, Commerce Clearing House, Aviation Law Service, par. 1820.
3. *DeWitt* v. *San Francisco*, 2 Cal. 290 (1852); McQuillin Municipal Corporations (2nd Ed.), Vol. III, Sec. 1225; 43 C. J. *Municipal Corporations*, Sec. 2084, page 1329.
4. *Ibid.*

Some statutory and constitutional problems may be encountered. Because of the unusual character of the municipal activity and since it involves extraterritorial functions, express statutory authorization would be required. Municipal functions generally are confined to express grants of authority. This rule gains applicability when the city ventures outside of its territorial limits. There are cases which have permitted the purchase and development of real estate outside city limits without express statutory authority but in furtherance of some necessary or legitimate municipal purpose, and, therefore, as a necessary implication thereof.[5] However, the establishment of an airport is the purpose in and of itself and furthers no other municipal duty or activity. There are several courts that have validated the establishment of airports outside corporate limits—in all instances, express statutory authority covered the activity[6] or a general statutory grant of authority was extended to cover the establishment of an airport.[7]

Constitutional attack may be made on the ground that the contribution of funds violates provisions contained in most state constitutions forbidding the loaning of municipal credit or donating of funds in aid of any corporation or individual. In Ohio, this provision prevented a municipality from participating in a joint enterprise with a private corporation. The constitution, it was said, would and did "forbid the union of public and private capital or credit."[8] But a contrary position was taken in Oregon.[9] However, these cases are distinguishable so long as the airport is being fostered by two public bodies, viz., municipalities. The constitutional provision is apparently directed against financial cooperation between a private and a municipal corporation.

Again, it might be urged that municipal funds are being expended for a non-public purpose. If the project taken alone were in furtherance of a public purpose, no reason appears to revise its designation because two rather than one municipality are engaged.[10]

The cooperation of two cities in the establishment of a joint airport encourages the creation of more and better airports. What may be too great an expenditure for one municipality may not be for two. A joint airport located in one of two cities may be accepted whereas a foreign airport regulated by a neighboring city would not.

Many municipal functions lend themselves to joint establishment and maintenance, e.g., bridges connecting two cities, ferries, water supply, sewage disposal plants, irrigation, parks and sanitaria. One common way of exer-

5. *Schneider* v. *Menasha*, 118 Wis. 298, 95 N. W. 94 (1903—power to own stone quarry implied from power to improve streets); *Somerville* v. *Waltham*, 170 Mass. 160, 48 N. E. 1092 (1898); *Maywood Co.* v. *Village of Maywood*, 140 Ill. 216, 29 N. E. 704 (1892). *Pioneer Real Estate Co.* v. *Portland*, 119 Ore. 1, 247 Pac. 319 (1926—Sewer outlet); *McQuillin*, *supra*, Sec. 1210 and Sec. 1969.

6. *Wichita* v. *Clapp*, 125 Kan. 100, 263 Pac. 12 (1928); *State ex rel Hile* v. *Cleveland*, 26 Ohio 265, 160 N. E. 241 (1927); *Silverman* v. *Chattanooga*, 165 Tenn. 642, 57 S. W. (2d) 552 (1933). *Ebrite* v. *Crawford*, 215 Cal. 724, 12 P. (2d) 937 (1932). See notes 4 JOURNAL OF AIR LAW 437, 3 JOURNAL OF AIR LAW 462.

7. *City of Spokane* v. *Williams*, 157 Wash. 120, 288 Pac. 258 (1930); *State* v. *Clausen*, 157 Wash. 451, 289 Pac. 61 (1930)—power to establish airport outside limits implied from power to acquire property by eminent domain outside corporate limits).

8. *Alter* v. *City of Cincinnati*, 56 Ohio St. 47, 46 N. E. 69 (1897); *Village of Brewster* v. *Hill*, 128 Ohio St. 343, 190 N. E. 766 (1934).

9. *Municipal Security Co.* v. *Baker County*, 39 Ore. 396, 65 Pac. 369 (1901).

10. *Reinhart* v. *Mac Guffie*, Pa. Ct. of Com. Pleas. of ..... decided May, 1933, Commerce Clearing House Aviation Law Service, par. 1511 (question whether county could join with city in development of airport) *Cf. Hunnicutt* v. *Atlanta*, 104 Ga. (1898—Attempt by city to acquire county courthouse by first purchasing a 1/5 interest invalidated on ground that acquisition of 1/5 interest was for profit and not for corporate purposes).

cising local functions which spread beyond the boundaries of a single municipality is to create a separate municipal district to perform that one function—irrigation districts, park districts, sanitary districts are examples. So, too, an airport district could be created.[11] The disadvantage is that additional governmental agencies are established in the same territory, with added administrators, expenses and taxes.

LEE A. FREEMAN.*

DIGESTS

Airport—Public Nuisance.—[California] Action by city attorney of Los Angeles to abate a public nuisance—an airport operated in the residential section of the city. The airport had been established fifteen years ago and prior to the development of the surrounding area. It was used for sightseeing trips and student instruction.

The evidence demonstrated that in the present operation of the airport:

(a) great quantities of dust were stirred up and blown into the surrounding residential area, due to prevailing winds;

(b) planes approached from an easterly direction over the residential area and, in landing, descended to such low altitudes as to be a menace to the residents;

(c) many shore flights were taken daily, and oil was occasionally dropped on the homes of residents and surrounding premises;

(d) motors were gunned causing loud and sudden noises;

(e) automobile traffic congestion was caused.

Held: The airport involved was not an important one and was not properly erected, operated and equipped. As operated, it was a public nuisance. Furthermore, the owners or operators would not and could not gain prescriptive rights to maintain such a nuisance from prior or long use. Injunction was granted to restrain such operations as had disturbed or annoyed the occupants of the residential area. *People of State of California* v. *Dycer Flying Service, Inc.*, California Superior Court, City of Los Angeles, decided March 31, 1939. Commerce Clearing House Aviation Law Service, par. 1818.

L. A. F.

Conflict of Laws—Workmen's Compensation—State in Which Contract Was Executed vs. State of Employment and Injury.—[Washington] An employee of Northwest Airlines, Inc., in the course of his employment in the State of Washington was killed. While he had resided and worked in Washington, his contract of employment was executed in Minnesota. The defendant air line claimed the laws of Minnesota rather than the laws of Washington controlled. The court, however, denied this contention and pointed out:

(a) that the Washington Compensation Act provides for a mandatory and exclusive form of relief and establishes a broad and comprehensive public policy;

(b) that to give effect to the Minnesota statute would be to repudiate the clear policy and provisions of the Washington Act; would deny the certain and sure relief provided;

(c) that it is no greater hardship for a foreign employer to comply with the compensation acts of the various states than for the State of Washington to enforce the obligations imposed by foreign jurisdictions. *Livermore Adm'x* v. *Northwest Airlines, Inc.*, Washington Superior Court, County of Spokane, decided March 1, 1939, Commerce Clearing House Aviation Law Service, par. 913.

L. A. F.

Insurance—Interpretation of Participation in Aviation or Aeronautics With Relation to Airplane Passengers.—[Federal] Decedent, a fare-paying passenger on a Transcontinental and Western Air Lines plane to Pitts-

11. California Airport District Act, *General Laws of California* (1937) Act 150.

* Of the Chicago Bar.

burgh, was killed in a crash. His insurance policy exempted death "as a result of participation in aviation, aeronautics or subaquatics."

Held: The exemption clause does not apply to passengers. A forceful statement of the *raison d'etre* of the decision (and recent cases in conformity therewith) is worth quoting:

> "We think that the later cases reflect a changing attitude toward aviation, due no doubt to the marvelous progress made in the art of flying. In the early days each flight was a venture. The pilot and passenger, if he had one, flew tandem, or side by side, in an open cockpit over unknown terrain, to make-shift landing fields. Today transport flying is a business. The air lines have modern landing fields and passenger stations, and their established scheduled routes are protected by radio beams, beacons, weather reports, etc. They compete with each other for patronage, and people in increasing numbers are using their services as a matter of course. Their passengers no more participate in the operation of their planes than do passengers upon a railroad train participate in operating the train or those upon an ocean liner participate in navigating the ship. They pay their fares and passively accept the services and accommodations offered. The pilot is employed because of his skill and efficiency. The passenger is not permitted to direct or control him as to how, where or when he shall fly. Any sensible passenger would not presume to do so. If it was ever true, it cannot now be said that a fare-paying passenger on a commercial air liner 'participates in aviation or aeronautics.' Words, after all, are but labels whose content and meaning are continually shifting with the times."

The Massachusetts Protective Association, Inc. v. *Bayersdorfer,* U. S. Circuit Court of Appeals, 6th Circuit, decided June 28, 1939, Commerce Clearing House, Aviation Law Service, par. 530.

L. A. F.

Transcontinental Airline—What Constitutes "Doing Business" by a Foreign Corporation for the Purpose of Service of Process.—[Federal] The plaintiff, a resident and citizen of New York, brought this suit in the Federal District Court against the defendant, a Delaware Corporation, for the alleged wrongful death of the plaintiff's intestate, a resident and citizen of New York, arising out of an airplane accident in Ohio while the plaintiff's intestate was a passenger on one of defendant's planes on a regular flight. The defendant moved to vacate and set aside the service of process and to dismiss the complaint on the grounds (1) that it was not doing business in New York, (2) that it was not properly served, and (3) that for the court to entertain the suit would constitute an unreasonable burden on interstate commerce and a denial of due process. The defendant's principal place of business was in Chicago, but it had a ticket office and passenger station and waiting room in New York City, at which it received information as to weather conditions and regularity of flights, and conveyed such information to passengers, and from which office its passengers were transported to its Newark, N. J., airport by an independent bus concern, but whose busses while in such engagements bore the defendant's name. The defendant's regular eastern airport was at Newark, N. J., but it maintained two alternative landing fields in New York. It maintained a bank account in New York City for the temporary deposit of receipts and for the payment of expenses incident to its New York office. Other than as stated, the defendant's agents in New York City had no authority to and did not make contracts for the defendant in New York or otherwise represent it there. It evidently advertised New York City as the eastern terminus of its line.

Held: Motion denied. The defendant is engaged in business in New York; service of process on its "District Traffic Manager," in charge of its New York City office, is proper service of process on it; and the maintenance of the suit and trial of the action in New York will not unduly burden interstate commerce and does not constitute a denial of due process. See Comment 10 JOURNAL OF AIR LAW AND COMMERCE 430.

Morrell v. *United Air Lines Transport Corp.,* United States District Court for the Southern District of New York—Decided June 6, 1939—C.C.H. Aviation Law Service, par. 3059.

C. G. B., JR.

BOOK REVIEWS

THE CIVIL AERONAUTICS ACT ANNOTATED. By Charles S. Rhyne. Washington, D. C.: National Law Book Company, 1939. Pp. 324.

This work is a study of the Civil Aeronautics Act of 1938, the Congressional history which produced it, and the precedents upon which it was based. It was the first undertaking of its kind considering this new federal regulatory agency, the Civil Aeronautics Authority. It is designed, in the words of the author, "to give a picture of what Congress considered while enacting the congressional policy back of it." The picture is presented by following the "historical development step by step from the first Congressional consideration of legislation affecting aeronautics up to the present Act. Six hundred and twenty-four footnotes document the text with references to the authorities for statements made. These authorities include: Bills introduced in Congress, hearings before congressional committees, law review articles on aeronautical legislation both proposed and adopted, and miscellaneous material and writings bearing on particular phases of Federal regulation and activities in the field of aeronautics. Statutes having similar provisions to those incorporated in the Civil Aeronautics Act are cited, together with the decisions of the courts construing them." A complete bibliography on aeronautical law and regulatory experience is furnished.

The body of the text is written in clear, narrative style and the chapters are divided into appropriate headings. The first ten chapters deal with federal aeronautical activities prior to 1925, and then follows a discussion of the Air Mail Act of 1925 (Kelly Bill), the Air Mail Act of 1934 (Black-McKeller Act), the Air Commerce Act of 1926, and the legislative proposals leading up to the Civil Aeronautics Act of 1938. Chapter XI begins the discussion of the 1938 Act. Subdivision B of this chapter deals with the administrative provisions which are explained briefly but adequately, and the text is documented and amplified by foot-notes. Subdivisions C through E cover Air Carrier Economic Regulation (each part—Certificates of Convenience and Necessity, Permits to Foreign Carriers, Tariffs to be Filed, Rates for Carriage of Persons and Property, Transportation of Air-Mail, and Regulation of Business Practices—being given individual consideration), Regulation and Recordation of Aircraft, and Safety Provisions. Subdivision F, part 1, takes up the procedural provisions of the Act and part 2 sets forth the Rules of Practice of the Authority in full. Subdivision G contains a brief discussion of the miscellaneous provisions (Airports, Amendments, Repeals, etc.). Appendix A contains a list of Bills introduced in Congress from 1934 up until the Civil Aeronautics Act; appendix B a list of Bills introduced in Congress from 1919 up to the adoption of the Air Commerce Act of 1926; and appendix C the full text of the Civil Aeronautics Act of 1938. Appendix D contains the full text of the Air Commerce Act of 1926, as amended.

This volume is an appropriate handbook for the aviation industry, be the user pilot, operator or lawyer. It served a great need by its early appearance, and yet that has marked some of its limitations because some parts, such as the Rules of Practice, are already outmoded. However, the history behind

the 1938 Act will not change nor is the Act likely to undergo substantial revision in the near future.

WILLIAM G. RATHJE,
HOWARD C. KNOTTS.

AIRPORTS AND AIRPLANES AND THE LEGAL PROBLEMS THEY CREATE FOR CITIES. By The National Institute of Municipal Law Officers, 1939. Pp. 51.

For a number of years municipal corporations, park districts, counties and other political subdivisions have been wrestling with the new administrative and legal problems incident to the acquisition and operation of airports, plus the protection of the approaches of such airports. Few precedents have been available and yet the increase in air traffic, the size of the municipal investment, the strict rules for federal assistance in connection with CWA, PWA and WPA projects, and the tendency to build in the vicinity of airports has intensified these problems, and many political subdivisions have had to "make a stab at" ordinances to satisfy immediate needs.

Therefore the booklet put out this year by the National Institute of Municipal Law Officers in cooperation with the United States Conference of Mayors should be welcomed in every municipal family. Its editors John A. McIntire and Charles S. Rhyne are to be congratulated upon digging up so much orderly material from their own researches and from the responses of the 101 city attorneys to their questionnaire. The section on the municipal regulation of flying is noteworthy in that it proposes an ordinance which recognizes the necessity of giving first recognition to the federal air traffic rules.

The political subdivisions affected by airports will have internal problems of little interest to aeronautical people, except that airport management should be kept free from political influences, but each person who flies has a very definite interest in the proper maintenance of an airport and having it so zoned as to be free from obstructions. Therefore all aviation should make voluntary contributions of experiences to the National Institute of Municipal Law Officers, 730 Jackson Place, N. W., Washington, D. C., else its files will lack a record of important municipal legislation and activities with respect to airports and the regulation of flying. It is hoped that the booklet will be reissued annually, at the same modest price, in order to keep up with the numerous new developments in this field.

HOWARD C. KNOTTS.